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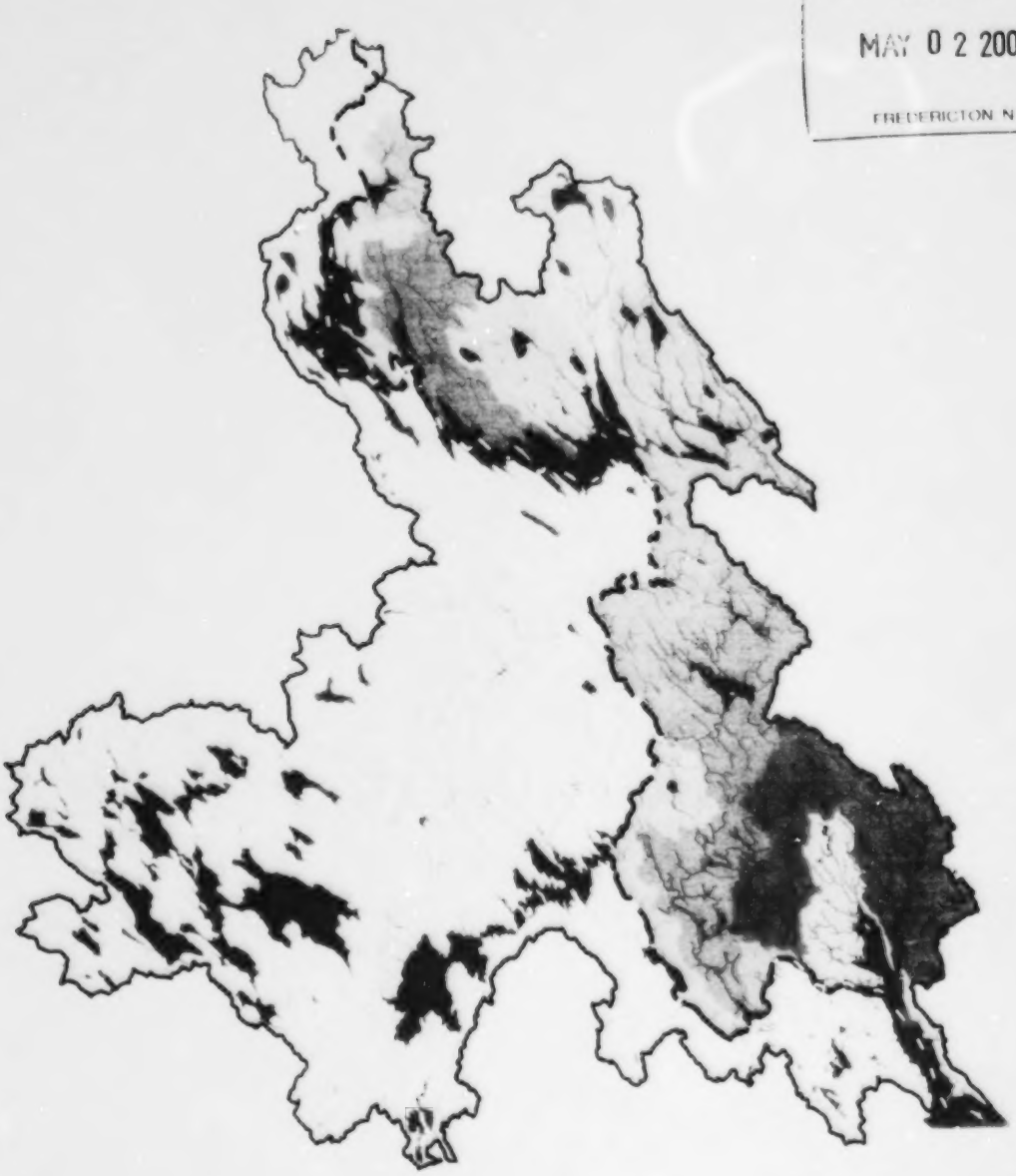

Future Water Quality in the St. Croix Watershed: A proposal for preliminary surface water classification under New Brunswick's Clean Water Act

prepared by
St. Croix International Waterway Commission

March 2000

Funded by
New Brunswick Environmental Trust Fund
"Your Environmental Trust Fund at Work"

New Nouveau Brunswick

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The St. Croix International Waterway Commission facilitates planning and action benefiting the resources, heritage, economy and way of life in the St. Croix River corridor of New Brunswick and Maine. It is a charitable, not-for-profit organization that provides tax deductible receipts for American and Canadian contributions. For more information on the Commission and the longterm management plan for the St. Croix International Waterway, please contact us:

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St. Croix International Waterway Commission
March 2000

Overview

Water is the most fundamental natural resource: New Brunswick has abundant clean water now and this contributes directly to the quality of life, the economy and the environment in the province. To maintain these advantages in the future, the New Brunswick Clean Water Act establishes a framework for managing water quality and use through a variety of means. One of these is a water classification system that will categorize surface waters into quality classes and ensure their management according to the goals set for each class. The classification system will apply ultimately to all of New Brunswick's rivers, lakes and streams but is being piloted first in selected watersheds around the province. The St. Croix watershed is one of these.

The proposed classification program -- to be finalized in a Water Classification Regulation planned for adoption in 2000 -- establishes six classes for New Brunswick's surface waters, ranging from a highest quality class for drinking water supplies to an acceptable class for more heavily-utilized waters. Classifying waters will involve four essential steps:

1) Assessing water quality through field testing and historical data review
2) Identifying future use goals through public consultation and land use evaluation
3) Developing a local proposal for water classification, for consideration by the Department of the Environment
4) Finalizing and implementing classification through Ministerial Order

Between June 1999 and March 2000, the St. Croix International Waterway Commission led studies and consultations to develop a preliminary proposal for the future classification of the waters within the St. Croix watershed, a 1655 km^2 area of southwestern New Brunswick. This report summarizes that project and presents its results in the form of recommendations to the New Brunswick Department of the Environment.

The Department of the Environment is expected to review this report, conduct followup studies and consultations and, in due course, promulgate an Order that will classify all of the waters of the St. Croix watershed under a Water Classification Regulation.

Water Quality and the Classification Concept

The Importance of Surface Waters

New Brunswick relies heavily upon its rivers, lakes and streams to support the lives and livelihoods of its people.

★ Most New Brunswick communities depend upon surface waters for their municipal drinking water supply, thus avoiding the high cost and unpredictability of other alternatives

★ The majority of New Brunswick's primary industries rely upon free and abundant surface water to grow or process their products

★ Nearly one-fifth of the electricity used in New Brunswick is generated by water power; it is currently the province's least expensive and only sustainable energy source

★ The fish, wildlife and recreational opportunities that make New Brunswick a desirable place to live and vacation are sustained by clean water

As the use of New Brunswick's waters continues to grow along with its communities and businesses, the province wants to ensure that this resource is well managed so that its use by a few does not erase the benefits belonging to all, now and in the future.

What Influences Water Quality?

The nature of the water in rivers, lakes and streams is determined by many factors, all of which are important in assessing and managing water quality. Key among these are:

Natural influences

Bedrock and surface geology are the most basic determinants of water character. As water flows from underground reserves or along land surfaces, it dissolves or transports elements from the rocks and soils that it passes. One example of this is water hardness: waters flowing through calcium and magnesium rich bedrock acquire mineral salts which cause residues in household pipes or laundry. Water can also acquire elements such as arsenic or iron from contact with bedrock that is naturally rich in these. Such impacts on water quality are common and occur in the St. Croix area.

Climate and weather affect both water quantity and quality. Under conditions of low rainfall and high temperatures, less water is available in streams and lakes to dilute existing pollution, bacteria flourish and algae increase. Conversely, heavy rains can cause runoff of soils, nutrients and bacteria which also affect water quality.

Natural biological processes have a significant effect on water. Common examples include: 1) decaying marsh vegetation and sunken logs release tannin that gives water a tea-like color; the decay process itself reduces dissolved oxygen; 2) shore vegetation moderates the rate of water runoff and creates shade that reduces the effects of summer heat; 3) wild animals raise

stream bacteria levels by defecating in or near the water. These and similar factors have led New Brunswick to incorporate the phrase "as naturally occurs" into its water standards, recognizing that waters vary in character and quality under natural conditions.

Human influences

Runoff from land activities (non-point sources) are now the most prevalent cause of water pollution. These occur virtually everywhere there is human activity and run a full gamut of sources, including the runoff of oils from roadways and nutrients from lawn fertilizers, the seepage from failed septic systems and soil erosion from land clearing. Many of the effects of non-point source pollution can be reduced through best management practices: New Brunswick will be encouraging such practices in its water quality strategy.

Direct discharges (point sources) are the "end of the pipe" sources that are readily associated with pollution. In most jurisidictions, including New Brunswick, stricter monitoring and standards are being applied to licensed discharges from industry and sewage treatment plants which contribute most of the fluid waste. This action is significantly reducing the total amount of pollution released to waterways.

Airborne pollutants -- the most noted of which are the nitrous oxides (NOx) which initiated the "acid rain" debate in the 1970s and mercury which has held the focus in recent years -- come to the Maritimes largely from coal-burning power plants and industries in the central United States and Canada but to a lesser extent are caused by car and waste stack exhausts from within the region. Airborne pollutants reach surface waters through rainfall or snow melt and can then, directly or through interactions, alter natural chemical and biological processes. Governments have taken some steps to reduce such emissions at their source, however momentum is building to act more decisively.

Watercraft pollutants also influence water character. Fuels, sewage and other substances that are inadvertantly or deliberately released by shipping traffic, recreational craft and other water-based activities affect both fresh and marine water quality.

A fluid situation

Because water is constantly in motion, pollution does not remain at its source. Winds, currents and tides carry water down a river, across a lake and far along tidal shores. For this reason, New Brunswick will implement water classification on a watershed basis, so that planning will take into account the quality objectives at the source and destination of traveling waters.

How is Water Quality Protected?

Legal Framework

Under common law, water is a public resource owned collectively by the people of Canada

and is administered by the government in that right. The **British North America Act** of 1867 devolves jurisdiction over fresh water management to the provinces while retaining jurisdiction over marine waters and selected uses (for example fisheries and navigation) to the federal government. Estuaries, the tidal waters where fresh and salt waters mix, fall less clearly into these jurisidictions. Waters which are mostly fresh are generally a provincial responsibility and those which are mostly salt a federal responsibility, however this dividing line varies with definition and the changing tides.

The **Canada Water Act**. (Chapter C-11, Consolidated Statutes of Canada) defines Canada's regulatory basis for managing national water resources, including their conservation, development and utilization. Its provisions include control of water pollution and also arrangements for federal/provincial and federal/foreign management of the quality of waters in mutually-specified areas. The Great Lakes water quality program is an example of the latter.

The **New Brunswick Clean Water Act** of 1989 (Chapter C-6.1, New Brunswick Revised Statutes) establishes the legal framework for managing and protecting all waters of the province, including surface, ground and well waters. Current Regulations under this Act that affect surface waters include the Watercourse Alteration Regulation (which guides water and shoreland uses), the Watercourse Setback Regulation (which protects designated drinking water supplies) and the Water Quality Regulation (which regulates licensed water discharges). A Water Classification Regulation to implement the surface water management provisions of the Act is proposed for adoption in 2000. This is described more fully in the section on *New Brunswick's Water Classification Program.*

International Obligations

The **Boundary Waters Treaty** of 1909 obligates Canada and the United States to manage their shared waters, and the waters that flow to them, in a manner that does not disadvantage the other party. Much of the Treaty deals with water levels and flows, however Article IV provides that "the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other". The Treaty established the US/Canada International Joint Commission (IJC) and gave it authority over approvals of boundary dams and diversions and, when requested by the two federal governments, the authority to address other water issues. On such a reference, the IJC studied the St. Croix's water resources in 1955-1957. This study led, in ensuing decades, to the creation of an IJC St. Croix International Advisory Board on Water Pollution, IJC guidelines for dissolved oxygen and pH for the St. Croix boundary waters and IJC support for advances in wastewater treatment and fisheries restoration. The IJC's St. Croix board reported that water quality in the lower St. Croix was improved ten-fold between 1972 and 1986 alone, however the IJC retains the authority to take additional steps to maintain or improve the St. Croix's boundary water quality if deemed necessary.

Maine and **United States** jurisdiction begins at mid-channel on the international St. Croix and waters flow across this line without respect for nationality. Pollutants discharged on one side inevitably reach the other to cause quality management problems for both. Guided by its own water classification program (which began in 1954) and the U.S. Clean Water Act of 1972 and its later

revisions, Maine has taken considerable steps to improve and manage state waters. New Brunswick's water classification system draws heavily upon the Maine model and makes it possible to establish complementary standards for the shared boundary waters. Maine's current water quality classifications for its side of the St. Croix are given below.

Table 1. Maine water quality classification standards for state waters of the international St. Croix, at 1999.

Boundary water segment	Maine water class	Comparable NB water class
All lakes	GPA	AL
River above Woodland Flowage	A	A
Woodland Flowage to Calais head-of-tide	C	C
All tributaries above Milltown dam	A	A
All tributaries below Milltown dam	B	B
Calais head-of-tide to the Narrows	SC	C
Marine waters below the Narrows	SB	--

Maine's water classifications are next scheduled for review in 2002, at which time classification of the Woodland to Calais segment may be re-considered due to improved water quality.

New Brunswick's Water Classification Program

The New Brunswick Water Classification Regulation proposed for adoption in 2000 will establish the process for managing the province's surface waters to ensure that they will meet the quality goals set for them. Current and proposed uses will be taken into consideration in categorizing surface waters into six quality classes and the program will be applied on a watershed basis (i.e. all the waters that drain into the same river system) as a logical management unit. The proposed classes, their standards and management conditions are shown in Table 2. The steps of the water classification process are outlined in the section *Developing a Classification Proposal*.

New Brunswick's water classification program is a goal-oriented. It will be possible for residents to decide that a stream which currently meets Class C criteria should be categorized as Class B, and lay out a plan and timetable to achieve this. Conversely, a river segment that is currently Class A quality might be recommended as Class B to allow for anticipated future uses. The Water Classification Regulation will provide for both options. It will also allow for future changes in classification to reflect changing needs.

In preparation for the Regulation's adoption, the New Brunswick Department of the Environment has entered into partnerships with local groups in five watersheds to pilot the water classification process and to help in developing appropriate methods and materials for its delivery.

When the Water Classification Regulation becomes law, the classifications proposed within these watersheds will become eligible for early implementation. The Department of the

Table 2. Overview of the proposed New Brunswick Water Classification standards.

Class	Summary Description	Bacteria Standard # *e. coli*/100ml of water sample	Dissolved Oxyen Standard Parts per million oxygen in water	Aquatic Life Standard	Trophic Status Standard (lakes only)	Prohibited Activities
O	**Outstanding natural waters:** Exceptional natural waterbodies, by nomination to the Minister	as naturally occurs	as naturally occurs	as naturally occurs	as naturally occurs	release of a contaminant; significant withdrawals
AP	**Designated drinking water supplies:** Waters designated under the Watercourse Setback Designation Regulation	no *e. coli* or fecal coliform, <10 total coliform. <10% of samples in 30 days or 2 consecutive samples show any coliform.	as naturally occurs	as naturally occurs	as naturally occurs	any activity not permitted under the Watercourse Setback Designation Regulation
AL	**All lakes not classed as O or AP:** Suitable for freshwater aquatic life and primary contact activities (ex: swimming). Some impoundments may be exempted from this class.	as naturally occurs	coldwater species: >9.5 for early life stages, >6.5 for later life stages. warmwater species: >6.0 for early life stages, >5.0 for later life stages	as naturally occurs	status stable or changing naturally; free of algae blooms that impair use	release of new contaminants; continued release of existing contaminants unless AL is standard met; new mixing zones
A	**Waters with excellent quality:** Suitable for freshwater aquatic life, primary contact activities (ex: swimming) and other uses as long as the A standard is met	as naturally occurs	same as AL class, plus > 80% saturation for tidal waters	as naturally occurs	N/A	release of a contaminant unless A is standard met; mixing zones
B	**Waters with good quality:** Suitable for freshwater aquatic life, primary contact activities (ex: swimming) and other uses as long as the B standard is met	<200 (geometric mean of min. 5 samples in a 30 day period). <14 for estuaries with identified shellfish beds	same as A class	supports all native aquatic species. no negative change to biological community	N/A	release of a contaminant unless B standard is met; mixing zones unless they meet minimum standards
C	**Waters with acceptable quality:** Suitable for freshwater aquatic life, secondary contact activities (ex: boating) and other uses as long as the C standard is met	<400 (geometric mean of min. 5 samples in a 30 day period). <14 for estuaries with identified shellfish beds	same as A class	supports all native fish species, may cause some change to biological community	N/A	release of a contaminant unless C standard is met; mixing zones unless they meet minimum standards

Environment will then begin to expand its involvement with interests in other watersheds to apply the classification program province-wide.

Table 3. Pilot watersheds for the New Brunswick Water Classification Program.

Watershed	Area (km^2)	NB region	Local coordinating entity	Year started
Magaguadavic, Lepreau, New, Digdeguash and Pocologan Rivers (composite)	3010	SW	Eastern Charlotte Waterways Inc.	1998
Hammond River	433	SW	Hammond River Angling Assoc.	1998
Tabusintac River	717	SE	Tabusintac Watershed Association	1999
Peticodiac River	2401	SE	Peticodiac Watershed Monitoring Group	1999
St. Croix River (N.B. side)	1655	SW	St. Croix International Waterway Commission	1999

Everyone is Involved

Because everyone affects and benefits from water quality, New Brunswick is committed to involving all in setting and meeting the province's water quality goals.

The earlier section on *What Influences Water Quality?* refers to how everyday actions change water quality. A later section on *Local Goal-Setting* indicates how residents and water users take part in selecting future water quality goals.

Ultimately, all will also be involved in maintaining water quality. While surface waters can often maintain or restore their quality under some pollution, setting longterm quality standards in the face of the growing demands on water use will come at some costs. These may be as simple as changing personal habits -- using less lawn fertilizer for instance -- or have greater implications such as precluding high-impact uses near some waters or requiring the upgrading of some pollution control facilities. Under the new regulation, it will be a provincial offence to use water or surrounding land in a way that (a) constitutes an activity prohibited under the regulation, (b) causes a waterbody to cease to meet its classification standard or (c) impedes progress toward achieving a classification standard set for a waterbody.

Setting water quality goals and adhering to them is a longterm commitment that deserves full public participation. After all, the benefits of clean water will be everyone's to enjoy.

The St. Croix Watershed in New Brunswick

A Watershed Profile

The St. Croix watershed is the largest coastal river basin lying between the Saint John River system, primarily in New Brunswick, and the Penobscot River system, in Maine.

It is a transboundary waterway, with the U.S./Canada border located at mid-channel along its main course from source to mouth. Of its 4188 km^2 drainage, 2532 km^2 (60%) lies in Maine and 1655 km^2 (40%) lies in New Brunswick. The international Gulf of Maine extends outwards from this apex.

The system's boundary status brings aspects of its use under the purview of the governments of Canada, New Brunswick, Maine and the United States, as well as the International Joint Commission. In 1986, New Brunswick and Maine entered into an agreement to co-manage the boundary waters portion of the system for their mutual benefit and, to this end, have adopted a longterm comprehensive management plan for the boundary corridor and established the St. Croix International Waterway Commission to guide that plan's implementation.

The Maine portion of the watershed will not be included in this document except in passing reference. The following is information general to the St. Croix watershed in New Brunswick. Additional detail on specific sub-watersheds is presented in the *Findings & Recommendations* section.

Climate

The St. Croix is in a northern temperate climatic zone which experiences annual precipitation (rain and snow) in the general range of 100cm and an average annual temperature in the range of 5°C.

The heavier snowfalls and greater temperature ranges occur in the upper part of the watershed, which is removed from the coastline's moderating effects. Recent (1986-1997) weather records show the upper part of the watershed to have an average annual precipitation of 103.1cm, with the greatest share in August, November and May. The August rains, the result of a storm belt that stretches across the upper lakes, help to replenish lake levels in mid-summer. The lower portion of the watershed averages 104.7cm precipitation annually, the heaviest generally in November and May. (Source: U.S. National Weather Service cooperative station database records for Houlton #173944, representing the upper basin, and Woodland #179891, representing of the lower basin).

Temperature ranges also vary between the upper and lower basins, according to the same database for a 30-year record of 1961-1990:

Upper basin (represented by Houlton)
Average annual temperature: 4.3°C
Average monthly minimum temperature: low (January) -17.3°C high (July) 12.3°C
Average monthly maximum temperature: low (January) - 5.2°C high (July) 25.7°C
Lower basin (represented by Woodland)
Average annual temperature: 6.1°C
Average monthly minimum temperature: low (January) -8.4°C high (July) 19.9°C
Average monthly maximum temperature: low (January) -2.0°C high (July) 26.7°C

While local residents will recall recent summers as unusually hot and dry, the climate of Atlantic Canada has not matched the national warming trend over the last 50 years and in fact has cooled somewhat during that period (1996-1997 Canada Country Study, *www.climatechange.gc.ca english html impacts.html*). During the El Nino and La Nina global conditions of the past two years, this region has experienced less variation in average temperature and rainfall than many other areas of North America (NOAA National Climatic Data Center, *www.ncdc.noaa.gov ol climate globalwarming.html*).

Geology

The St. Croix watershed is located in the extreme southwestern end of New Brunswick, covering a 1655 km^2 area that extends in the north from the foothills of the vistigal Appalachian Mountain range above Fosterville in York County to the marine waters of Passamaquoddy Bay at St. Andrews in Charlotte County. Physiographically it is a subdivision of the New Brunswick Highlands. The basin falls visibly into two sections, upper and lower, joined at a 3 km wide waist (see Figure 1). Its provincial portion is the sixth largest watershed in New Brunswick, after the Saint John, Miramichi, Restigouche, Nepisiguit and Peticodiac watersheds in that order.

The bedrock of the St. Croix watershed reflects the area's ancient mountainous past, and appears in conspicuous bands running southwest to northeast roughly parallel to the coastline. Remnants of a 400 million-year-old mountain range form the calcium- and sodium-rich granite base that underlies most of the upper half of the watershed, with minor areas of heat and pressure metamorphosed sediments from this range along Monument and Mill Brooks and the north side of Skiff Lake. To the south of this granite mass lie calcium-rich sediments near the outlet of Spednic Lake which are a result of the prehistoric sea that once flowed inland from the Miramichi area.

The lower part of the watershed has a more varied underlay. The majority of the area north of Routes 3 and 730, and including Upper Little Ridge, is a continuation of the calcium-bearing sediments found at the base of Spednic Lake. Granite bedrock from ancient mountains re-appears in outcrops at Upper Mills, Barter Settlement, St. David Ridge, Tower Hill, Todd's Point and upper Bayside. Volcanic rock high in sulphide mineralization underlies the greater St. Stephen area, the Ledge, Hills Point and portions of Bayside. Surrounding these granitic and volcanic pockets are, to the north and west, 450-500 million year old marine sediments (from the Woodland Flowage to the Gallop Stream drainage); metamorphosed mountain sediments (at the Waweig drainage) and younger 400-350 million year old calcium-rich sediments (at lower Bayside and St. Andrews).

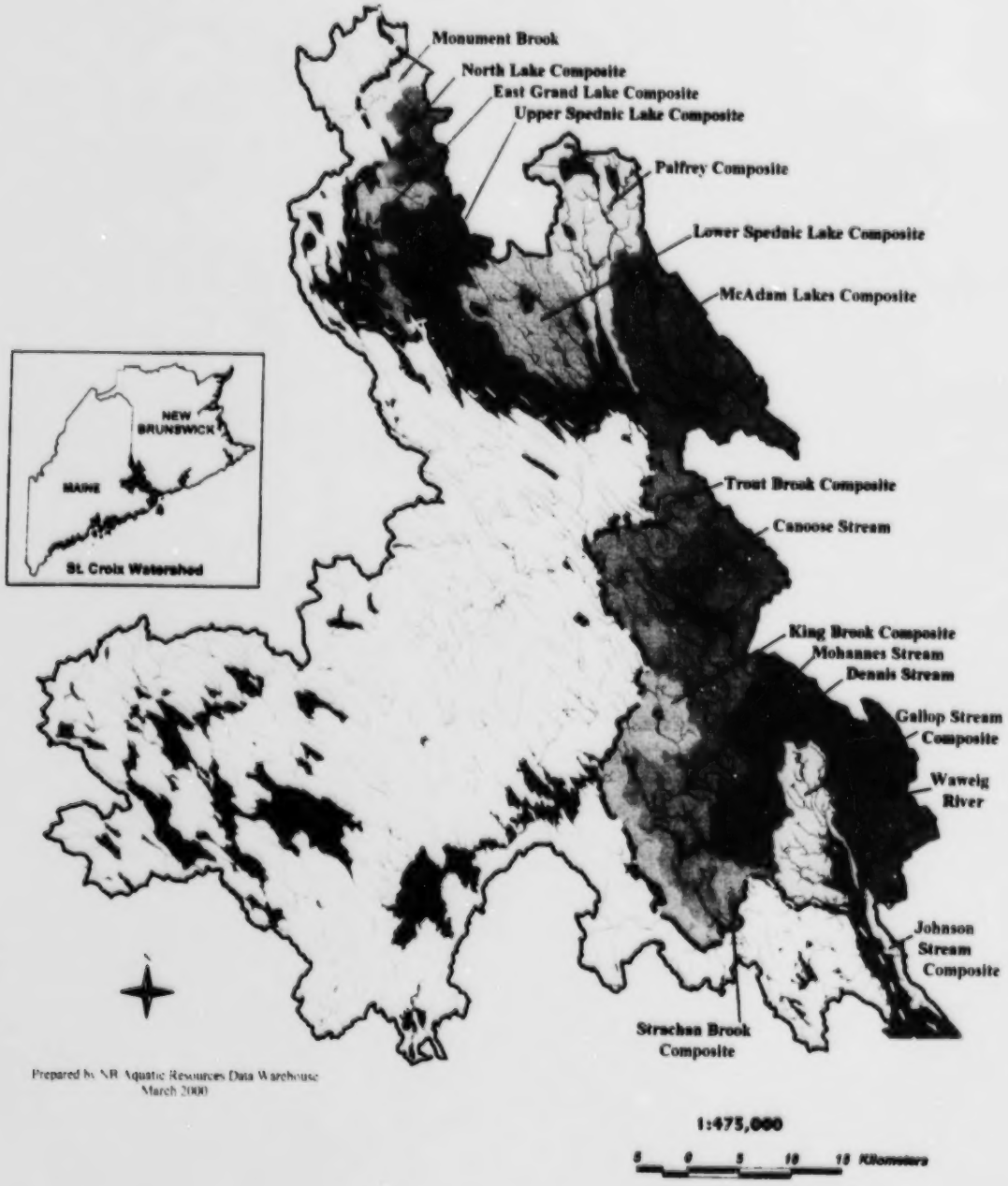


Figure 1. St. Croix watershed of New Brunswick and Maine, showing New Brunswick sub-watersheds in the preliminary study for provincial Water Classification. (Hydrography sources: Service New Brunswick and Maine Department of Environmental Protection.)

In terms of water quality, the calcareous (calcium-rich) character of much of the watershed's bedrock counteracts the effects of acid rain and acidic bogs to maintain a neutral pH preferred by most aquatic species. Waters that flow through areas of the metal-bearing sediments alongside granites are more prone to raised levels of arsenic, copper, zinc, other metals (including gold) and sulphates. The volcanic bedrock in the St. Stephen area is highly metallic, showing elevated amounts of arsenic, chromium, nickel, copper, zinc and base metals, as well as sulphates.

The surface geology of the watershed strongly reflects the effects of the last ice age in which, some 15,000 years ago, melting glaciers carved the St. Croix's lakes and valleys, ground rock into gravel and soils and deposited these in their wake. The glacial retreat occured in a southeast to northwest direction (roughly at right angles to the bedrock layers), orienting most flowing waters and lakes in this direction and creating the depressions that became the St. Croix's many bogs and wetlands.

Much of the St. Croix watershed is overlayed by Carleton shaly loam, (which has good drainage and fair-to-good suitability for crops and other vegetation) and small outpockets of Canterbury shaly loam (a poorly draining, unproductive soil).

In the upper watershed, these loams predominate along the boundary corridor but are replaced by productive, well-draining Caribou shaly loam in the inland portions of the upper reaches and low-productivity Pinder gravelly sandy loam (well-draining) or McAdam gravelly sandy loam (poorly-draining) around the McAdam lakes.

In the lower watershed, the departures from the Carleton and Canterbury shaly loams are seen mostly on the lower St. Andrews peninsula, which is overlain by a well-draining, fairly productive Parleeville gravelly sandy loam, and in pockets in the Upper Mills/St.Stephen/West Oak Bay area where a productive, fair-draining Fundy silty clay is found.

In water quality terms, most of these soils have lower pH (3.5-4.0) and calcium levels near the surface due to leaching, but higher levels at depth. On the poorer draining soils, runoff from rain and snowmelt (and any characteristics these carry with them) is accelerated; the better-draining soils tend to hold more of this water, delaying and even mitigating some of its impacts.

Demography

The St. Croix region is sparsely settled, having at the 1996 census just 15,698 residents in civil divisions that lie within or extend outward from the 1,655km^2 New Brunswick portion of the watershed. Only 16% of the population resides in the upper half of the watershed and the majority of this in McAdam, the only municipality there. Of the remainder in the lower part of the watershed, the majority live within 2km of the estuary waterfront and most in the two municipalities, St. Stephen and St. Andrews.

Additional information from the 1996 census is given in Table 4. Other features to note:

- The upper half of the watershed, in addition to its sparse population, has significantly higher reliance on primary resource-based occupations and more than double the level of unemployment compared to the lower half of the watershed. These figures have changed little from the 1986 or 1991 census, except in the Village of McAdam where unemployment has declined by over 8 percentage points in the last 10 years, due notably to recent business starts.

- The residents of coastal areas of the lower watershed have the highest average standard of living and generally the lowest unemployment. This may reflect a preference for place of residence rather than the location of work, as people in the lower watershed often commute. However unemployment in this area has declined significantly, from 2 to 22 percentage points depending upon civil unit, since the 1986 census and business starts and expansions are on the rise.

- The St. Croix population is slightly older than the provincial average. A comparison of the St. Croix and provincial populations by age category suggests that this is due to the longevity of residents aged 65 and older who live in the St. Croix area and, to a lesser extent, to an outflow of younger residents aged 25-54 who go elsewhere to find work.

Economy and Land Use

The upper watershed, with the exception of the Village of McAdam, is a combination of very small rural settlements and -- on North, East Grand and Skiff Lakes -- shorefront developments of seasonal or year-round homes. Nearly 90% of the land base is forest, managed primarily for commercial timber production. Residents in this area are employed largely in businesses in the nearby community of Canterbury (just outside the watershed), in public sector jobs or in the forest industry. The local population rises significantly in the summer as cottagers from larger communities outside the watershed take up seasonal residence.

Unpaved provincial highway and wood roads connect this portion of the upper watershed to the Village of McAdam in the south. McAdam is a small commercial center which has seen some resurgence in its economy through the recent development of manufacturing businesses and related trucking. Located on under-utilized highway and railway routes extending into the U.S. and seeking to restore a massive railway station that is a national historic site, the community hopes to continue to build upon its potential.

The lower watershed is similar in nature. Most of the land base is in commercial timber production, with a scattering of agricultural and other land uses, until reaching the urban and suburban areas along the coastline. This portion of the watershed has a good network of provincial highways and other paved roads which allow the population to be highly mobile: this and an improving economy have led to a transition away from the urban centers to live, if not to work. Benefiting the most from this trend have been the Parishes of St. Andrews (Chamcook) and St. Croix (Bayside) which have seen their populations increase by 27% and 14% respectively. Most of Chamcook and its population are located outside of the St. Croix watershed, however Bayside and other areas which have seen 2-4% population growth are in the St. Croix basin.

Table 4. Demographic profile of civil units lying in whole or in part in the St. Croix watershed, New Brunswick. From the Canada Census of Population for 1996. (Source: Statistics Canada's internet site *ww2.statcan.ca english profil* , extracted February 2000).

civil unit	area (km^2)	St. Croix subwatersheds	# people	# private dwellings	average age	average income	% unemployment	# employed 1° industry	# employed 2° industry	# employed 3° industry
Municipality										
McAdam	13	McAdam	1,570	630	40.4	16,096	18.3	70	115	405
St. Stephen	12	Strachan, Dennis	4,961	2,015	39.0	20,888	15.7	40	475	1,630
St. Andrews	8	Johnson	1,752	755	42.7	24,431	10.8	20	80	710
Parish										
North Lake	473	Monument, North, Upper/Lower Spednic, Grand, Palfrey	213	105	45.2	**	36.8	0	10	75
Canterbury	570	Palfrey	607	210	36.2	16,043	30.2	40	55	140
McAdam	555	Lower Spednic, McAdam, Trout	106	45	41.1	**	30.8	10	25	35
St. James	497	Trout, Canoose, King, Mohannes, Dennis	1,398	490	35.6	15,453	21.7	115	160	415
St. Stephen	104	King, Mohannes, Strachan, Dennis	1,890	680	35.3	18,984	15.9	60	255	605
Dufferin	13	Gallop	451	185	41.5	18,238	13.2	10	45	205
St. David	197	Gallop, Waweig	1,641	610	36.0	18,469	20.4	105	185	490
St. Croix	76	Waweig, Johnson	657	235	33.9	24,403	18.3	15	90	235
St. Andrews	25	Johnson	452	170	37.1	23,732	8.3	10	40	18
Total St. Croix*	2,543		15,698	6,130	38.3	19,781	17.0	495	1,535	4,963
New Brunswick	73,437		738,133	272,915	36.1	20,755	15.5	25,990	69,580	256,680

1° (primary) industry: resource-based harvesting & agriculture; **2° (secondary) industry**: manufacturing & construction; **3° (tertiary) industry**: service sector

* Many of the civil units extend beyond the St. Croix watershed boundaries; numbers exclusive to the watershed are not available but would difer somewhat.

** Statistics Canada does not derive these figures for a survey population of this small size; calculation of average income for the watershed excludes these civil units.

The Town of St. Stephen is a regional commercial center, located on a major highway at the Canada/U.S. border. Its residents are employed primarily in the commercial, transportation and public sectors and, with recent growth, in manufacturing. The town is home to a well-known candy making firm however the majority of its manufacturing employment is in wood-based products. The community hopes to continue to expand its involvement in this sector, maintain its other strengths and develop an active tourism base.

The Town of St. Andrews is a noted seaside historic resort with additional strengths in marine research and post-secondary education. Most of its workforce is employed in these areas and, recently, in the nearby aquaculture industry. An older average age base reflects an active retirement community. The town hopes to continue to build upon its three major focii while retaining its historic character.

Table 5 summarize the overall land use in the watershed. Land use information on a sub-watershed basis appears in the *Findings & Recommendations* section of this document .

Table 5. Land use in the upper and lower portions of the St. Croix watershed.

Land Use Category	Upper Watershed		Lower Watershed	
	Area (km^2)	Percent	Area (km^2)	Percent
Agriculture	2.87	0.4	43.65	4.9
Forest	602.16	78.0	729.03	82.6
Burn	0.01	--	0.04	--
Gravel pit	0.33	--	2.06	0.2
Mine/Quarry	0	--	0.31	--
Industrial	2.51	0.3	6.45	0.7
Rural Land Use	1.88	0.3	10.26	1.2
Urban Land Use	1.75	0.2	6.77	0.8
Park	3.92	0.5	0.05	--
Roads/Utilities	5.37	0.7	15.53	1.8
Rivers/Lakes	121.83	15.8	17.76	2.0
Wetlands	29.35	3.8	51.04	5.8
TOTAL ALL	771.98	100.0	882.95	100.0

Land use data from 1999 NB Dept. Natural Resources & Energy forest cover database and 1999 Service New Brunswick real property attribute database.

Land Ownership

While land use has remained relatively constant within the watershed, land ownership has changed dramatically in the last year. In May 1999, The Timber Company, a wholly-owned subsidiary of the Georgia-Pacific Corporation, sold all of its New Brunswick holdings -- including 780 km^2 or 47% of the St. Croix watershed -- to the Province of New Brunswick. This acquisition, combined with existing provincial holdings, made the province the dominant landowner within the watershed. Table 6 shows this precedence and the relative ownership by other interests.

Lands underlying waterbodies present a special case. These are generally the property of the province, as are coastal shorelands between the normal high and low water mark, but with some exceptions. For simplicity, all of these have been listed separately as submerged lands on this table, without distinction to ownership.

The Province is currently considering options for the forner Georgia-Pacific forest lands and in the interim is managing the area for timber harvest at a reduced cutting rate. Future uses of this

Table 6. Land ownership within the St. Croix watershed. Crown Land refers to land owned by the Province of New Brunswick under management of the Department of Natural Resources & Energy; land managed by other provincial departments is listed as Provincial Land - Other.

Ownership	Upper Watershed		Lower Watershed	
	Area (km^2)	Percent (%)	Area (km^2)	Percent (%)
Crown Land - Former Georgia-Pacific land	520.72	67.5	259.14	29.4
Crown Land - Queen/Charlotte Timber Licence	0	--	35.54	4.0
Crown Land - York Timber Licence	14.85	1.9	0	--
Crown Land - Provincial Park/Park Reserve	4.25	0.5	0.06	--
Crown Land - Other	0	--	0.99	0.1
TOTAL - CROWN	*539.82*	*69.9*	295.73	*33.5*
Municipal Land	0.39	0.1	2.25	0.3
Provincial Land - other	0.17	--	3.22	0.4
Federal Land	0.02	--	0.11	--
Private Land - Industrial forest	56.92	7.4	11.72	1.3
Private Land - Other	51.99	6.7	551.07	62.4
TOTAL - OTHER	*109.49*	*14.2*	*568.37*	*64.4*
SUBMERGED LANDS	122.68	15.9	18.85	2.1
TOTAL ALL	771.99	100	882.95	100

Land use data from 1999 NB Dept. Natural Resources & Energy forest cover database and 1999 Service New Brunswick real property attribute database.

major portion of the watershed will not be known until the Province resolves its intentions. A timetable for decision-making has not yet been set.

Other Water Planning Considerations

In 1993, at the request of the Province, the St. Croix boundary waters were designated a Canadian Heritage River -- the first such designation in Atlantic Canada and, to date, one of only five in this region. Retaining this national status involves implementing a heritage river management plan (this is the same St. Croix Management Plan developed in partnership with Maine) and protecting heritage resources such as water quality.

The St. Croix Management Plan commits New Brunswick and Maine to establishing complementary high water quality standards for the boundary waters and meeting these through ongoing water management programs. It also commits all waterway interests to active consultation and participation in management actions. To ensure that provincial water classifications adopted for the St. Croix boundary waters will best address all needs, primary water users on both the New Brunswick and Maine sides of the international St. Croix have been asked to contribute their views.

The St. Croix Sub-Watershed Planning Units

The St. Croix watershed is comprised of smaller drainages that are, in themselves, functional water quality management units. These sub-watersheds, individually or in composites, are simpler to describe and to present current findings for than is the entire watershed. These are shown in Figure 1 and Table 7 and are mapped and described further in the *Findings & Recommendations* section of this document.

Some waters of the basin were treated differently from the others in the water classification planning process. The St.Croix boundary waters were addressed as a separate management unit to reflect their shared, international status. Also, except for the waters upstream of Spruce Point on the mainstem and Hills Point on the Waweig, the waters of the St. Croix estuary (including Oak Bay) were excluded from provincial classification at this time as these waters are under federal jurisdiction.

Boundary Waters

Addressed as a distinct management unit are the New Brunswick waters of: Monument Brook, North Lake, the Thoroughfare, East Grand Lake, Forest City Stream, Mud Lake, Mud Lake Stream, Spednic Lake and Palfrey Lake, Grand Falls Flowage, Woodland Flowage and all portions of the St. Croix River to Spruce Point, Dufferin Parish, on the tidewaters.

New Brunswick Sub-Watersheds

The sub-watershed units that were delineated and used in this planning process are

identified below.

Table 7. New Brunswick sub-watershed units used in the preliminary water classification process.

Sub-watershed Unit Name	Includes all waters draining to
In the Upper Watershed	
Monument Brook	Monument Brook
North Lake Composite	North Lake
East Grand Lake Composite	East Grand Lake, Mud Lake, Forest City Stream, Mud Lake Stream
Upper Spednic Composite	Spednic Lake west of the Musquash Flowage
Lower Spednic Composite	Spednic Lake between and including Musquash Flowage and Silas Cove
Palfrey Composite	Palfrey Lake (includes Skiff, Grassy and LaCoote Lakes and their sub-drainages)
McAdam Lakes Composite	Diggity Stream (includes the McAdam Lakes chain) Spednic Lake south of Diggity Stream
In the Lower Watershed	
Trout Brook Composite	St. Croix River between Vanceboro dam and Canoose Stream
Canoose Stream	Canoose Stream
King Brook Composite	St. Croix River between Canoose Stream and Mohannes Stream
Mohannes Stream	Mohannes Stream
Strachan Brook Composite	St. Croix River between Mohannes Stream and Dennis Stream
Dennis Stream	Dennis Stream
Gallop Stream Composite	St. Croix River between Dennis Stream and Waweig River
Waweig River	Waweig River
Johnson Cove Composite	St. Croix River between Waweig River and Indian Point

Developing a Classification Proposal

Project Definition

This project completed the first three steps of the proposed Water Classification Program:
1) Assessing water quality through field testing and historical data review
2) Identifying future use goals through public consultation and land use evaluation
3) Developing a local proposal for water classification, for consideration by the N.B. Department of the Environment

Because the Water Classification Regulation has not yet been adopted, this represents a pilot study to develop 'preliminary' classification proposal for the St. Croix watershed. When the proposed Regulation becomes law, a further formal consultation will be completed prior to the final step of the Classification process:
4) Finalizing and implementing classification through a Ministerial Order

The major components of the three steps taken to date are described below. Each of these was required by the N.B. Department of the Environment and was developed and implemented in regular consultation with that agency.

Mapping

Three computer-generated map series were developed to provide a visual reference and planning tool for classification and to give the public a better perception of the St. Croix watershed as a dynamic management area. Information assembled from these maps is summarized in various sections of this report.

ArcInfo GIS data layers for the map series were obtained from existing provincial databases and assembled by the N.B. Aquatic Resources Data Warehouse under contract to the Commission. The wall-sized maps and their GIS layers (except for select reserved data) are on file with the N.B. Department of the Environment's Environmental Quality Branch and hard copy maps are also on file at the Waterway Commission; some page-sized maps were generated for this document. All are described below.

Watershed and sub-watershed definition

To identify the watershed, three poster-sized maps were developed from data layers obtained from Service New Brunswick (SNB) and, for the Maine side, the Maine Department of Environmental Protection. The first map is of the entire international St. Croix watershed at 1:150,000 scale, highlighting the New Brunswick sub-watershed units adopted for the classification study. A simplified, miniature version of this map is presented in Figure 1.

Two additional maps, at 1:60,000 scale, focus exclusively on the upper and lower halves

of the St. Croix watershed in New Brunswick to give additional detail on sub-watershed geography, drainage areas and water sampling sites.

Land Use

General Land Use

Current land use and land use patterns give an indication of where water quality might be affected by human activity. Projections of these, based upon local knowledge and past trends, can help in selecting water quality goals that take future development into consideration.

Using existing GIS data layers, two poster-sized maps (upper watershed and lower watershed) were developed at a scale of 1:60,000 to show land use, in the following categories:

Water	Agriculture	Urban land use
Wetland	Gravel pit	Rural land use
Forest	Quarry/Mine	Industrial
Road/Rail/Utility corridor		

Computerized data for the categories in the first two columns was extracted from the N.B. Department of Natural Resources & Energy's 1999 forest cover inventory. Data for the categories in the last column (which all appear as 'Other' in the forest cover inventory) were developed from the Service New Brunswick (SNB) real property attribute files. While most of the land use categories are generally self-explanatory, some deserve further description:

The Industrial category includes properties listed and taxed under one of the 40 industrial property codes of the SNB real property attribute system, except those which fell into other categories listed above (ex: gravel pit, utility corridor, etc). Some of these lots are no longer used for industry-related purposes however they were mapped as such to coincide with the SNB listing. Added to this Industrial category were all rural and municipal landfill sites active in the last 30 years, which SNB lists inconsistently.

The Urban and Rural land use categories were developed to capture the full range of residential, business, institutional and similar uses that take up most occupied properties. The Urban grouping was applied within the boundaries of the three municipalities (McAdam, St. Stephen and St. Andrews) and the Rural category used in the remaining unincorporated areas.

The Agriculture category over-estimates significantly the amount of land in active agriculture, as the assignation is based solely upon aerial photography. The watershed contains many open or overgrown fields which are no longer used for agriculture but are nevertheless classed to this use by the forest cover inventory based upon their cleared appearance.

Sources of primary water impacts

Specific activities such as sewage treatment plant discharges or road runoff affect water

quality on a localized basis. Identifying these and their effects is an additional aspect of water management planning.

Lists were compiled of primary point source ("end of pipe") and nonpoint source (runoff-related) influences on water quality, and also of the locations of petroleum storage and tanks and industrial and general dump sites, past and present. The 17 licensed point source discharges within the watershed, including Maine discharges that may affect the boundary waters, are listed in Appendix 2. Primary nonpoint source influences are listed in Appendix 3. The storage tank list is on file with NBDOE and the Commission but is not included in this document or on the maps.

Also reviewed were watershed projects that were registered under the province's Environmental Impact Assessment Regulation during the last five years, begin primarily industrial expansions and road or utility corridor developments.

Thee present and potential impact of all of these sources is considered in the *Findings & Recommendations* section.

Land Ownership

Land ownership gives a sense of the consistency and flexibility of future land use: management of public lands may be more predictable and potentially more restrictive than that for private lands.

Two poster-sized maps (upper watershed and lower watershed) were developed at a scale of 1:60,000 to show land ownership, divided into the following categories:
Crown Land - further categorized into former Georgia-Pacific land, Queen-Charlotte Timber Licence, York Timber Licence, Provincial Park/Park Reserve
Provincial Land - Other (e.g. held by departments other than Natural Resources & Energy)
Municipal Land
Federal Land
Private Land - Forestry industrial freehold
Private Land - Other

Water studies

Water quality and water quality trends were examined by reviewing existing records and by collecting new field data.

Historic Data

Water quality data collected by various entities for New Brunswick and boundary water sampling sites during the period 1980-1999 was assembled for review. The following sources were used (listed alphabetically):
Environment Canada: 1980-1998 data for sampling sites throughout the watershed

Georgia-Pacific Corp.: 1995-1997 data for boundary lakes
ME Dept. of Environmental Protection: 1993-1998 data for boundary lakes
NB Dept. of Environment: 1980-1999 data for lakes and streams
St. Croix Estuary Project: 1994-1999 data for streams along the estuary
St. Croix International Waterway Commission: 1993-1998 data for boundary lakes

These data were used to make a general comparison of past and present test results for selected locations in the upper and lower portions of the watershed. While the historic data was too limited for statistical analysis, it generally showed that water quality in the upper watershed has remained consistently excellent and in the lower watershed is good and improving. The more recent data aided directly in the water quality assessments for this study.

Geological reference sources assisted in interpreting natural influences on water chemistry. Used particularly were N.B. Department of Natural Resources & Energy maps and reports on provincial bedrock geology, surficial geology and mineral occurances (1979-1984) and also Geological Survey of Canada stream sediment and water geochemical reconnaissance data (1991).

Current sampling

At the outset of the study, sampling sites throughout the watershed were selected in conjunction with the NB Department of the Environment (NBDOE) to reflect the water quality of the different stream drainages and lakes. As it was clearly not possible to test every water body, priority was given to the St. Croix River mainstem and major lakes, sites at the lower end of major tributaries (assuming good quality there would imply good quality upstream) and locations where activities suggested that water quality might be affected.

A total of 88 sites were sampled 1-5 times in the period June-October 1999. Included were 59 stream or river sites, 19 lake sites and 10 estuary sites. This was supplemented by data collected from five additional lake sites in 1998, using the same methodologies. During the year, exploratory sampling was also done for *e.coli* at four further sites on Billy Weston Brook and Dennis Stream. In all, 382 water samples were collected and analyzed for this water classification project.

[In addition to these assessments, the Commission's 1999 water program also included an ongoing international St. Croix watershed lake sampling program in cooperation with the Indian Township Tribal Government; monitoring of bacteria levels in water and clam samples for the conditional harvesting of the Oak Bay clam beds; collection of water samples during a spill incident in the main river; and coordination of an ongoing network of 13 volunteer lake monitors within the watershed.]

A list of the water classification sample sites and their sampling frequency is given in Appendix 1. These locations are identified in the sub-watershed reports in the *Findings & Recommendations* section of this document. Whenever possible, the sites were selected to correspond with historic sampling locations.

Water samples for flowing waters were collected just below the water surface and for lakes were sampled at four depths: sub-surface, secchi, mid-point and above bottom. NBDOE provided all sample bottles and laboratory analyses and the samples were collected and transported in accordance with NBDOE protocols.

In addition to the water samples, the following field data was collected at freshwater sites: water temperature (subsurface for streams, at 1m top-to-bottom depth intervals for lakes); dissolved oxygen (same frequency as temperature); local influences (water level, visible pollution, pertinent weather information, etc.) and -- for lakes only -- secchi depth (the depth to which a secchi disk can be lowered and still be visible). All of the above were collected consistent with NBDOE protocols with one exception: the lake secchi depth was observed with a Maine model II viewing scope, to give readings consistent with earlier baseline data.

At estuary sites, water samples were collected only for *e.coli* bacteria, as laboratory facilities were not available to test saline samples for the other parameters. Water temperature and salinity and general observations were also recorded.

A list of the freshwater test parameters is given in Appendix 4. A brief summary of laboratory and field methods appears in Appendix 5c, with futher detail available on request. Test results are provided for stream and river sites in Appendix 5a and lake sites in Appendix 5b. These have been entered in longterm water quality databases maintained by NBDOE and the Commission.

With few exceptions, tests for the sampled St. Croix waters showed excellent quality. Waters with exceptions are noted in the *Findings & Recommendations* section and in Appendix 7.

In addition to the water quality testing, additional information on dissolved oxygen levels was collected from the St. Croix River between Woodland and Upper Mills to evaluate the current effect of mill effluent on that parameter. On four separate occasions, all at low summer flow, dissolved oxygen and temperature were recorded at 23 stations along this river segment and the information, along with calculated percent saturation, was forwarded to water agencies and the Georgia-Pacific Corporation. On all runs and at all sites, the recorded dissolved oxygen levels and saturation levels met the proposed standards for New Brunswick Class A waters and the International Joint Commission guidelines for the St. Croix boundary waters.

As noted earlier, the proposed provincial Water Classifications are based upon criteria for *e. coli* bacteria, dissolved oxygen and aquatic life. The first two of these could be evaluated directly from historic and 1999 field studies. The third -- the Aquatic Life standard -- is still under development. During 1999, the Commission cooperated with NBDOE in assessments of aquatic macro-invertebrates ("bottom dwelling bugs") at nine sites in the St. Croix watershed. The information from these assessments, together with similar data from other pilot watersheds, will contribute to the development of provincial profiles of macro-invertebrate populations typical of waters in the various classification categories. The results of these studies are on file with NBDOE.

Pending the development of the aquatic life profiles, evaluations for the aquatic life standard for the St. Croix and other pilot studies have been based upon water chemistry and visual observations.

Local goal-setting

The water classification process combines information on current water quality (what is present now) with local expectations for land and water use (what is likely in the future) to resolve a realistic classification level that can meet many interests over the longterm. It also seeks local commitment to maintain each waterbody's classification standard once this is agreed upon and adopted.

In 1990, the Waterway Commission carried out extensive consultations within the St. Croix watershed and with government, both in New Brunswick and in Maine, to develop a provincial and state mandated longterm Management Plan for the boundary waters corridor. In this process, good water quality and water management ranked as the highest priorities by waterway residents, users and managers. Their views were formalized in policies of the Plan to set longterm water quality standards (Policy #2) and manage waters to maintain these standards (Policy #4).

Following development, this Plan went through extensive review at the local and governmental levels and was, in 1994, formally approved for longterm implementation by New Brunswick and Maine. New Brunswick also submitted the same plan to the federal-provincial Canadian Heritage Rivers Board as a management commitment to secure the river's formal designation as a Canadian Heritage River. Through these agreements and additional attention by the Canada/US International Joint Commission, effective management for good water quality within the St. Croix boundary waters has become a formal, voluntarily-adopted goal of New Brunswick and others.

Consistent with the St. Croix Management Plan, since 1990 the Commission has worked extensively with local interests and various government agencies on water quality monitoring and improvement projects along the boundary waters and elsewhere within the watershed. In these projects and in general consultations, groups and individuals have consistently stressed the importance of high water quality to their section of the St. Croix. This interest has led to a variety of cooperative, water-related programs, including those mentioned in the third paragraph of the *Current sampling* section, above.

For this water classification project, public consultations were undertaken beginning in June 1999 and extending through March 2000. These consultations are on-going: during the remainder of 2000 the Commission will continue to work with local interests to refine the classification studies and recommendations made to date and, in due course, the N.B. Department of the Environment will complete a formal public process before adopting St. Croix water classifications under Regulation.

To date, local goal-setting has been pursued by the following means:

Direct consultations (correspondence and/or meetings) were held during the project with the municipalities, Local Service District Advisory Committees, major companies and landowners (including the provincial government), local members of the N.B. Federation of Agriculture, lake and estuary organizations, and recreation and conservation groups. A list of these is given in Appendix 6.

General consultations (public sessions) were held across the watershed in March 2000 at Fosterville, Canterbury, McAdam, Scotch Ridge, DeWolfe, St. Stephen, Oak Bay and Bayside. These meetings were preceeded by a series of newspaper articles on the water classification program and public notices of meeting dates. The sessions included visual presentations and handouts on St. Croix classification and gave individuals the opportunity for direct or mail-in input. Means to reach the Commission were well publicized and everyone was encouraged to respond. A total of 86 people attended these meetings or sent in their views.

The results of these consultations are incorporated into the *Findings & Recommendations* section of this document.

Proposal development

Drawing upon the information gathered in the current studies and public consultations, and a decade of experience in St. Croix resource and management issues, the Waterway Commission developed this proposal for preliminary water classification for the St. Croix watershed. The classification recommendations contained in this report were reviewed with local parties through the consultation process and, the Commission believes, accurately reflect the views of the participants.

Findings & Recommendations for Preliminary Classification

Introduction

Between June 1999 and March 2000, the St. Croix International Waterway Commission carried out assessments of water quality, land and water use affecting quality, and trends and views regarding future water quality within the St. Croix watershed in order to develop for the New Brunswick Department of the Environment a preliminary proposal for the classification of St. Croix waters under a proposed Water Classification Regulation. This is the first step in a future formal classification process that will begin when the Regulation is adopted.

The proposed water classifications (see Table 2) are based upon standards for *e. coli* bacteria, dissolved oxygen, maintenance of aquatic life and, in the case of lakes, maintenance of trophic (nutrient) level. As noted in the section on *Developing a Classification Proposal*, field testing was used to assess the quality of many waters within the watershed that either represented the quality of individual sub-drainages or were believed likely to be affected by nearby land or water uses.

E. coli and dissolved oxygen testing provided direct measurements for the first two of these standards. As the province is still developing a formal measurement process for the aquatic life standard, in this project this was assessed based upon water chemistry and visual observations of aquatic habitat. Trophic levels were assigned based upon mid-summer phosphorus, nitrogen and chlorophyll *a* values obtained in field studies and upon fish species recorded by the Department of Natural Resources & Energy's Fish & Wildlife Branch.

The following pages present findings and recommendations in three sections: those applying to the Water Classification program or St. Croix watershed as a whole, those applying to the boundary waters and those applying to the 16 New Brunswick sub-watersheds.

General Findings & Recommendations

The majority of the St. Croix watershed enjoys excellent water quality due, in large part, to its extensive and largely commercial forestlands. Only a few waters in the lower, more urban areas yielded test results that do not meet Class A criteria at this time. Two areas of the watershed lie in designated drinking watersheds and will automatically received Class AP designation.

Details of these findings are noted in the sections that follow and in Appendix 7.

Non-point Source Management

While all but one of the St. Croix's point source discharges is in the lower reaches of the system (see Appendix 2), activities that cause non-point effects on water quality are ubiquitous

throughout the watershed (Appendix 3). Fortunately, many of these effects are easily reduced through preventative steps taken in planning or implementation, collectively termed "best management practices" or BMPs. A brief summary of some of these BMPs is given in Appendix 8.

The non-point source effects on water quality in the St. Croix watershed are typical to all of New Brunswick. The most common of these arise from roads and parking areas; shoreland practices related to residential development, timber harvesting or farming; inadequate home septic systems and former disposal sites. These, overall, have a significant impact on provincial water quality.

In the last decade, considerable progress has been made by the major forestry companies and the Department of Natural Resources & Energy in applying BMPs to reduce the effects of forestry practices on water quality. Equal attention is needed, by government and the public, to address other nonpoint sources.

General Recommendation: New Brunswick recognize that the reduction of non-point source pollution can directly benefit the province's economy and environment, and initiate a specific non-point source/BMP action program to obtain this longterm benefit.

Point Source Management

One of the primary criteria for provincial water classification is the level of *e.coli* bacteria, a health hazard that correlates principally to sewage pollution. However, the province does not have a standard or a discharge limit for this bacteria in licenses for the sources which contribute most of this pollutant.

General Recommendation: The New Brunswick Department of the Environment establish limits for *e. coli* in point source discharge licences and make available funding to assist with facility upgrading to comply with these limits.

Water Classification Studies & Implementation

New Brunswick is simultaneously developing a Water Classification Regulation and piloting aspects of its future implementation in five watersheds. The general guidelines for longterm program delivery are evolving through this development process. In the interim, pilot watersheds are pursuing mapping, consultation and recommendation avenues that are exemplary, but inconsistent.

General Recommendations: The New Brunswick Department of the Environment move quickly to set standards for the assessment and consultation aspects of classification development within provincial watersheds, so that these will join seamlessly in the province's longterm regulatory and management process. The Department also develop an operational framework for future water monitoring and action plan delivery to engage partners in implementing the classification program.

Boundary Waters

Many of the province's boundaries are located over water shared with a neighboring province or state. One-sided management of the quality of such boundary waters is impractical and ultimately unsuccessful, as pollutants flow freely across them. The N.B. Clean Water Act recognizes that cooperative management is desireable and provides the authority for the province to enter into agreements with others, including other governments, for water quality management.

General Recommendation: The New Brunswick Department of the Environment include, as an integral part of its Water Classification Program, consultations and cooperation with the governments of shared waters in establishing complementary classification and quality management initatives for its boundary waters. This would include collaboration with the State of Maine on boundary portions of the St. Croix and Saint John Rivers and with the Province of Quebec on the Restigouche River.

Protection of St. Croix Water Quality

People contacted in this study indicated that maintaining, if not improving, current water quality was very important to the St. Croix region. Many talked about ensuring that future development respected the existing quality, and felt that this was very achievable in most cases; in fact such a policy is already in effect on the Maine side of the watershed.

However, the proposed N.B. Water Classification Regulation intends to provide an option for changing the classification of waters not only upward, but downward. The latter could reduce the overall effectiveness of the classification program in protecting quality within the St. Croix system.

St. Croix Recommendation: New Brunswick carefully consider a non-degradation policy for the St. Croix watershed and consider implementing this by permitting re-classification to a higher standard but not a lower standard in the N.B. Water Classification Regulation in these waters.

Estuarine Waters

New Brunswick has stated its intention to include estuary (tidal) waters as well as fresh waters in the Water Classification program over the long term. As noted in the *Classification Concept* section, the dividing line between estuarine waters of provincial and federal jurisdiction is difficult to define. This can be overcome, in the interest of good management, through cooperation between levels of government.

This study proposes classification of the tidal St. Croix and Waweig River waters to locations consistent with other NB DOE regulations or with the discernible river mouths. These recommendations are based upon common sense and local land management objectives, and would mesh consistently with the future classification of the remaining St. Croix tidwaters.

St. Croix Recommendation: The New Brunswick Department of the Environment include in its

initial classification for the St. Croix watershed the tidal waters of the St. Croix River to Spruce Point and the tidal waters of the Waweig River to its mouth.

St. Croix Recommendation: The Province of New Brunswick engage the Government of Canada in the cooperative classification and management of water quality in the St. Croix estuary, consistent with the New Brunswick Clean Water Act and the Canada Water Act.

Outstanding Waters

The proposed Water Classification Regulation provides for the selection and special management of a class of Outstanding Natural Waters (O Class) which represent the natural types of waters found in the province or are unique in some way. Local interests nominate lakes or streams to this category and, if accepted by a special advisory panel and the Minister of the Environment, these are designated as O Class and then managed to maintain the qualities for which they are recognized.

This study did not assess St. Croix waters for potential Outstanding classification, however there are certainly lakes and streams within the watershed that have representative or unique features. As the Water Classification program becomes more defined, local interests are encouraged to explore options for some O Class nominations.

St. Croix Boundary Waters

Total drainage area: 133.5 km^2

Principal settlements: ***In New Brunswick:*** Fosterville, Forest City, St. Croix, Little Ridge, Upper Mills, St. Stephen, The Ledge, Bayside, St. Andrews. ***In Maine:*** Orient, Weston, Danforth, Forest City, Vanceboro, Baileyville, Baring, Calais

Principal waters: Monument Brook, North Lake, East Grand Lake, Forest City Stream, Mud Lake, Mud Lake Stream, Spednic Lake, Palfrey Lake, St. Croix River (including mainstem flowages and tidewaters)

Description:

From the source of Monument Brook to Passamaquoddy Bay, the boundary waters of the St. Croix system flow nearly 180 km through lakes, river course, flowages and tidewaters. New Brunswick waters join with those of Maine at the depth of channel, which meanders unpredictably between either shore. As explained in earlier sections, these waters engender special management considerations due to their international status and, on the New Brunswick side, their Canadian Heritage River designation.

The boundary waters have been used extensively for log driving, waste dilution and power production and show some effects of each. Low head dams at the outlets of East Grand and Spednic Lakes which once controlled flows for log drives continue to widen the existing lakes and manage water for flood control, fisheries and power production. Three larger dams widen the river at Grand Falls, Woodland and Milltown as they generate power.

Above the Woodland Flowage, the boundary waters have no point source discharges and nonpoint impacts are limited to those from residential development, mostly on North and East Grand Lakes. Water records dating back more than 30 years suggest near pristine quality, although there is some indication that development nodes may now be having localized impacts. Shoreland zoning provisions in Maine, and since 1995 for the St. Croix only in New Brunswick, are designed to buffer these waters from future land uses. The upper St. Croix River flows through commercial forestland, with significant development setbacks. Logs from earlier drives still mark the river bottom in many places; these and the marshes which drain to the river contribute color to the water.

Between the Woodland Flowage and the tidewaters below St. Stephen, the river receives the outfalls of 10 licensed point source discharges and additional municipal and industrial storm drains (see Appendix 3). Major investments in pollution reduction on the Maine side have significantly improved the water quality over the last 25 years. Much of the sawdust that once lined the river bottom has now flushed to the tidewaters.

The boundary waters corridor includes one provincial ecological reserve (the Grassy Islands) and six locations included in the provincial list of environmentally significant areas (East Grand Lake, Hinkley Point, Loon Bay, Clark Point, Grand Falls, Spragues Falls), and a number of bald eagle nesting sites. The river supports a small run of Atlantic salmon, a species which is nearing threatened status in Canada, and one of the province's few riverine populations of smallmouth bass. East Grand Lake holds one of the province's few self-supporting populations of lake trout.

Current status:

Segment*	Principal human uses	Principal water quality influences	Water test highlights** 1998-1999
Monument Brook	Recreation	marshes, forestry	4 sites: Has higher values for color, alkalinity, hardness, sulphates, arsenic, chromium, calcium, iron & manganese due to bedrock & marshes.
North Lake	Recreation, shoreline homes	marshes, residential	2 sites: same as above, mesotrophic

(status, cont.)

Segment*	Principal human uses	Principal water quality influences	Water test highlights 1998-1999
East Grand Lake	Recreation, shoreline homes	residential	4 sites: underground springs reduce effects seen upstream, oligotrophic
Mud Lake	Recreation		1 site: mesotrophic
Spednic & Palfrey Lakes	Recreation	marshes, forestry	4 sites: alkalinity & calcium lower, nitrogen higher than upstream due to natural causes. mesotrophic
St. Croix R., Vanceboro dam to Woodland Flowage	Recreation, power generation	marshes, forestry, sunken logs	4 sites: color increases along the course due to marshes & logs
St. Croix R., Woodland Flowage to Milltown dam	Waste assimilation, power generation, recreation	industrial & municipal outfalls, ur sunken logs	5 sites: Flowage retains logs & sediments affecting habitat. River to Milltown shows some effects of industrial, urban & natural discharges. Conductivity, sodium and potassium higher than upstream
St. Croix R., Milltown dam to Spruce Point	Waste assimilation, power generation, recreation	municipal outfalls, urban streams, road runoff, snow dumping	3 sites: shows notable effects of point and nonpoint discharges from St. Stephen and Calais, historic sawdust & industrial sediments line the tidewater bottom. Elevated *e. coli* due to municipal outfalls.

* lake segments include outfall stream
** see Appendices 5a, 5b and 7 for additional information

Future goals:

Existing land and water use patterns are expected to continue. Commercial forestry is expected to predominate the shores of most of these boundary waters. Further residential development, and the conversion of summer residences to year-round homes, is anticipated on North, East Grand, Mud and Palfrey Lakes, near the outlet of Spednic Lake and at Loon Bay. Additional residential development, downtown expansions and a new international highway crossing are expected in the greater St. Stephen and Calais areas. All licenced discharges are expected to remain active, with ongoing improvements to effluent quality.

Consistency is critical to water quality goal-setting for the boundary waters and is a primary policy of the longterm management plan which New Brunswick and Maine adopted for the St Croix. The field studies and consultations for this study support New Brunswick's classification of the St. Croix boundary waters in a direct match to their classification in Maine, with one exception: the river segment from Woodland Flowage to the Milltown dam best qualifies for Class B status in New Brunswick but is currently rated as Class C in Maine. Maine's rating was reviewed last in 1994, prior to major improvements in water pollution management in this river segment, and is due to be reviewed next in a statewide process in 2002. It is essential for longterm management that New Brunswick and Maine reconcile classification of this segment at that time.

Recommended preliminary classification:

Class A for all flowing waters above Woodland Flowage.

Class AL for North, East Grand, Mud, Spednic and Palfrey Lakes.

Class C for the St. Croix River from the Milltown dam to Spruce Point.

Formal classification of the St. Croix River from Woodland Flowage to the Milltown dam be reserved pending resolution of a compatible classification with Maine by the state's next classification review.

Action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations and apply shoreland zoning provisions to future development. *Ongoing.*

★ Set mixing zones for licensed discharges. *On adoption of the Water Classification Regulation.*

★ New Brunswick resolve with Maine a compatible classification of the Woodland Flowage to Milltown dam river segment; in the interim the NB Dept. of Environment manage these waters to maintain existing quality. *By 2003.*

★ Institute a road and parking area BMP program in St. Stephen to reduce road runoff and snow removal impacts on water quality. *By 2002.*

★ Engage lake shoreowners in a residential BMP program. *By 2003.*

★ Make capital improvements to St. Stephen's wastewater system to reduce *e. coli* bacteria and other pollutant discharges from treatment plants and storm drains. *By 2010.*

Monument Brook Sub-Watershed

Total drainage area: 33.1 km2
Principal settlements: None
Principal waters: Little Hay Brook

General description:

This subwatershed is almost exclusively forest land, managed for commercial harvest, and wetland.

Current status:

Principal land uses:

Forest (90%), wetland (9%)

Principal land ownership:

Crown (75%), corporate forestry interests (17%)

Principal water quality influences:

Point source: none

Nonpoint source: forestry

Water quality:

Sampled in 1999 at three sites [MON1, MON 1A, MON2A] on the boundary waters only. Some results slightly elevated for alkalinity, total organic carbon, arsenic and chromium -- all due to natural causes (bedrock and wetland). All tests results met Class A criteria.

Future goals:

Commercial timber production is envisaged as the continuing principal land use. The majority of the sub-watershed has been staked for potential gold mining but the quality of the ore relative to recent finds outside the watershed makes this likelihood remote; if undertaken this mining would be underground rather than open pit, thus reducing site impacts.

Recommended preliminary classification:

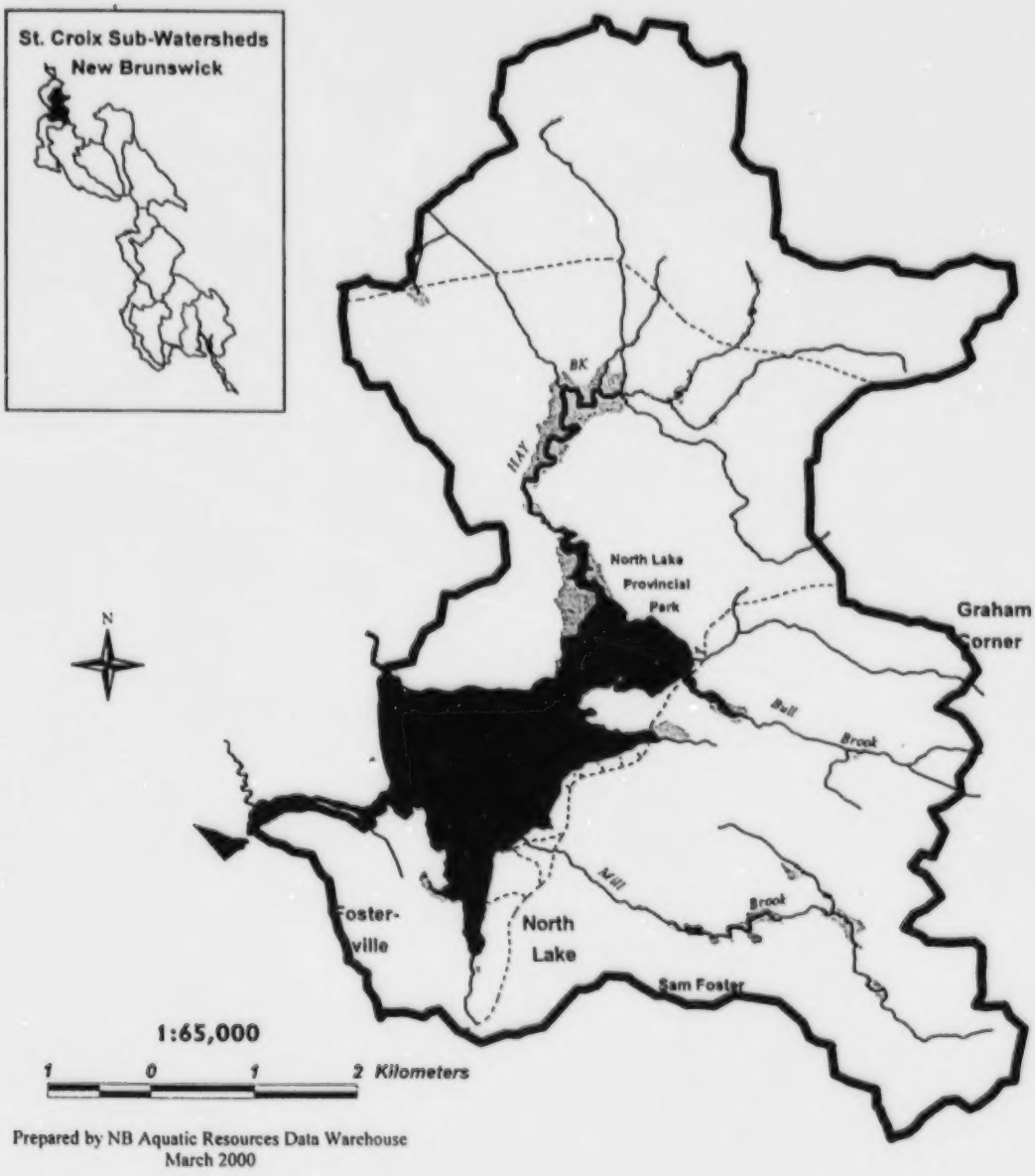
Class A for all waters in the Monument Brook sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Apply the province's Environmental Impact Assessment process to any mining development. *As warranted.*

North Lake Composite Sub-Watershed



Prepared by NB Aquatic Resources Data Warehouse
March 2000

Total drainage area: 46.0 km^2
Principal settlements: Fosterville, North Lake
Principal waters: Hay Brook, Bull Brook, Mill Brook

General description:

North Lake and its immediate shoreline are discussed under Boundary Waters. Most of this subwatershed is forest land, managed in large part for commercial harvest. Rural residences, some with farm fields, are scattered along Route 122.

Current status:

Principal land uses:

Forest (91%), wetland (5%)

Principal land ownership:

Crown (85%), private small holdings (14%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, roads, rural residential

Water quality:

Sampled in 1999 at two sites [HAY1, NMILL1]. All tests results met Class A criteria.

Future goals:

Commercial timber production is envisaged as the continuing principal land use. In time, residential development along Route 122 may increase but this would be at a slow pace. Much of the upper end of the sub-watershed has been staked for potential gold mining but the low quality of the ore relative to other recent finds outside the watershed makes this likelihood remote; if undertaken this mining would be underground rather than open pit, thus reducing site impacts.

Recommended preliminary classification:

Class A for all waters in the North Lake Composite sub-watershed.

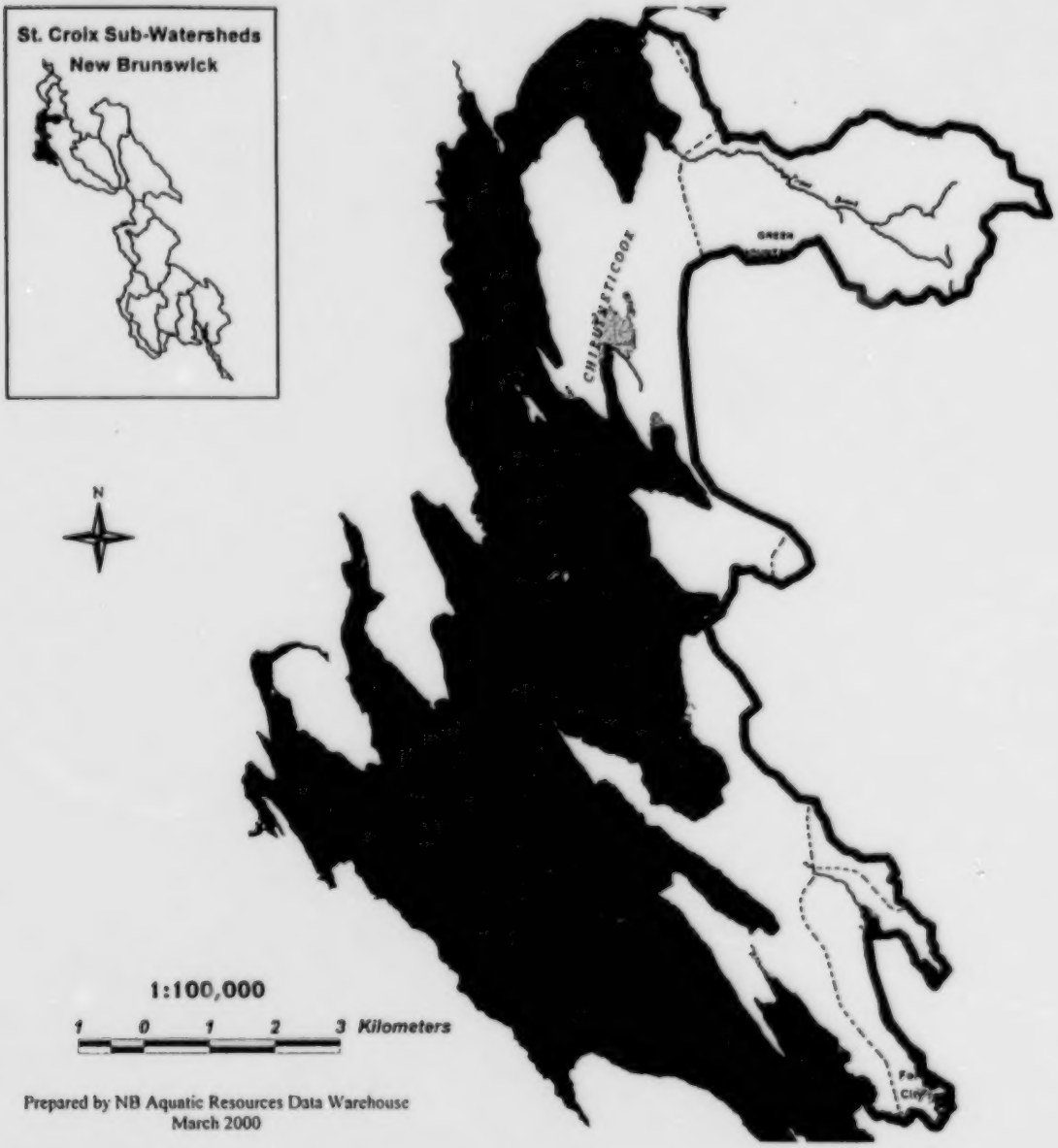
Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance and residential development. *By 2002.*

★ Apply the province's Environmental Impact Assessment process to any mining development. *As warranted.*

East Grand Lake Composite Sub-Watershed



Total drainage area: 67.2 km^2
Principal settlements: Fosterville, Green Mountain, Pemberton Ridge, Forest City
Principal waters: Trout Brook

General description:

East Grand Lake and its immediate shorelands are discussed under Boundary Waters.

Most of this subwatershed is forest land, managed in large part for commercial harvest. Rural residences, some with farm fields, are scattered along Route 122 and the Forest City Road. Fosterville, at the top of East Grand Lake, and Forest City, at the outlet of the lake, are the most densely settled locations.

A closed rural dump on Route 122 drains toward Trout Brook, another closed rural dump on the Forest City road drains to the Mud Lake boundary waters. Ducks Unlimited impounds a wetland at Balm of Gilead Cove on East Grand Lake, for duck habitat.

Current status:

Principal land uses:

Forest (94%), wetland (3%)

Principal land ownership:

Crown (67%), private small holdings (33%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, roads, rural residential, closed dump

Water quality:

Sampled in 1999 at one site [EGTR1]. One elevated *e. coli* result obtained, believed to be of natural causes. All other test results met Class A criteria.

Future goals:

Commercial timber production and limited residential development are seen as the principal future land uses.

Recommended preliminary classification:

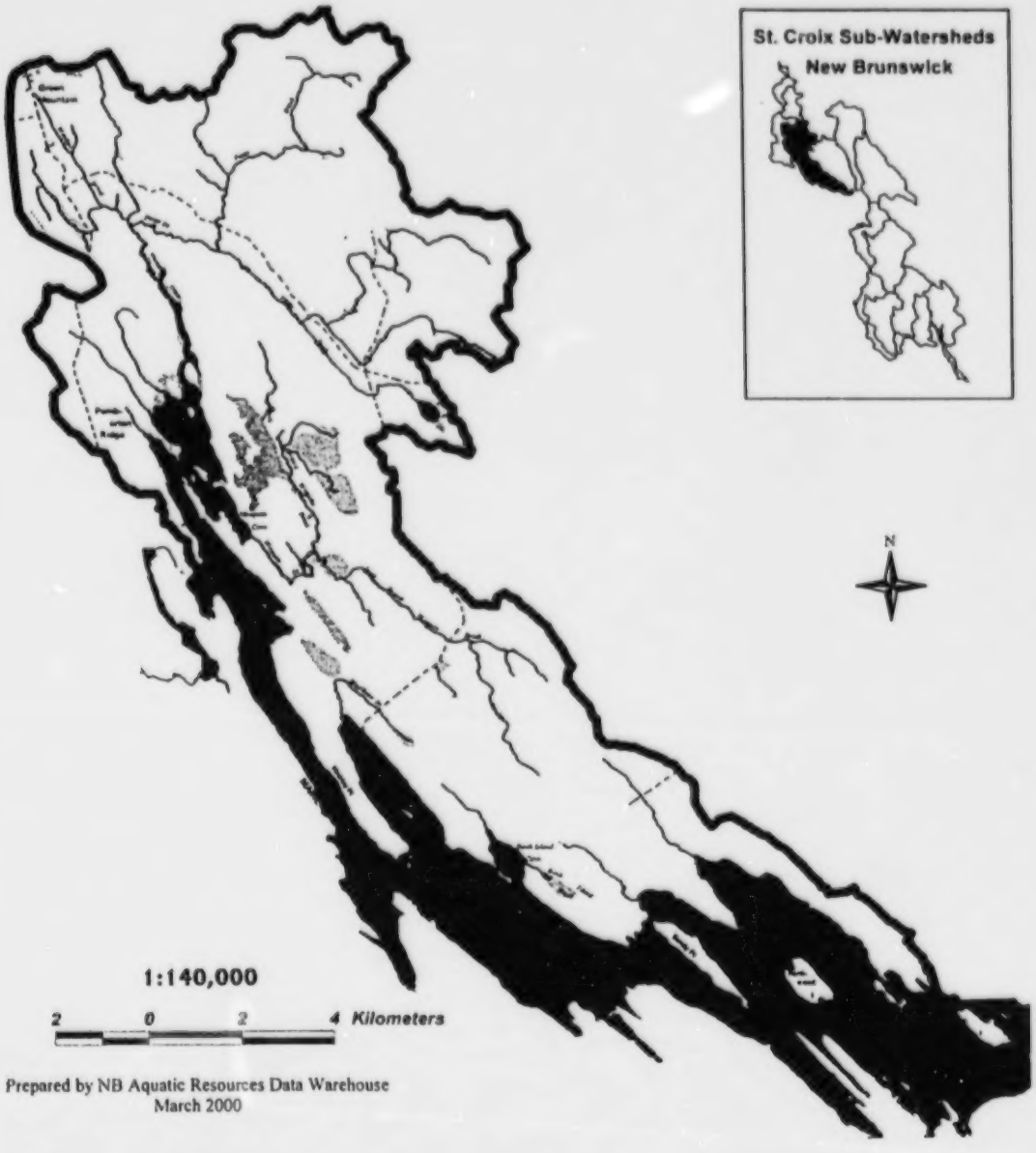
Class A for all waters in the East Grand Lake Lake Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use for road maintenance and residential development. Test dump sites periodically for potential leaching problems. *By 2002.*

Upper Spednic Lake Composite Sub-Watershed



Total drainage area: 164.4 km^2
Principal settlements: Pemberton Ridge
Principal waters: Pirate Brook, Mosquito Brook

Description:

Spednic Lake and its immediate shoreline are discussed under Boundary Waters. Nearly all of this subwatershed is forest land, managed for commercial harvest. Rural residences, some with farm fields, are scattered along the Forest City Road in the northwest corner of the drainage; a primary haul road traverses the upper portion.

Current status:

Principal land uses:

Forest (95%), wetland (3%)

Principal land ownership:

Crown (93%), private small holdings (7%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, roads

Water quality:

Sampled in 1999 at two sites [SMED1, PIR1]. All test results met Class A criteria.

Future goals:

Commercial timber production is envisaged as the principal future land use.

Recommended preliminary classification:

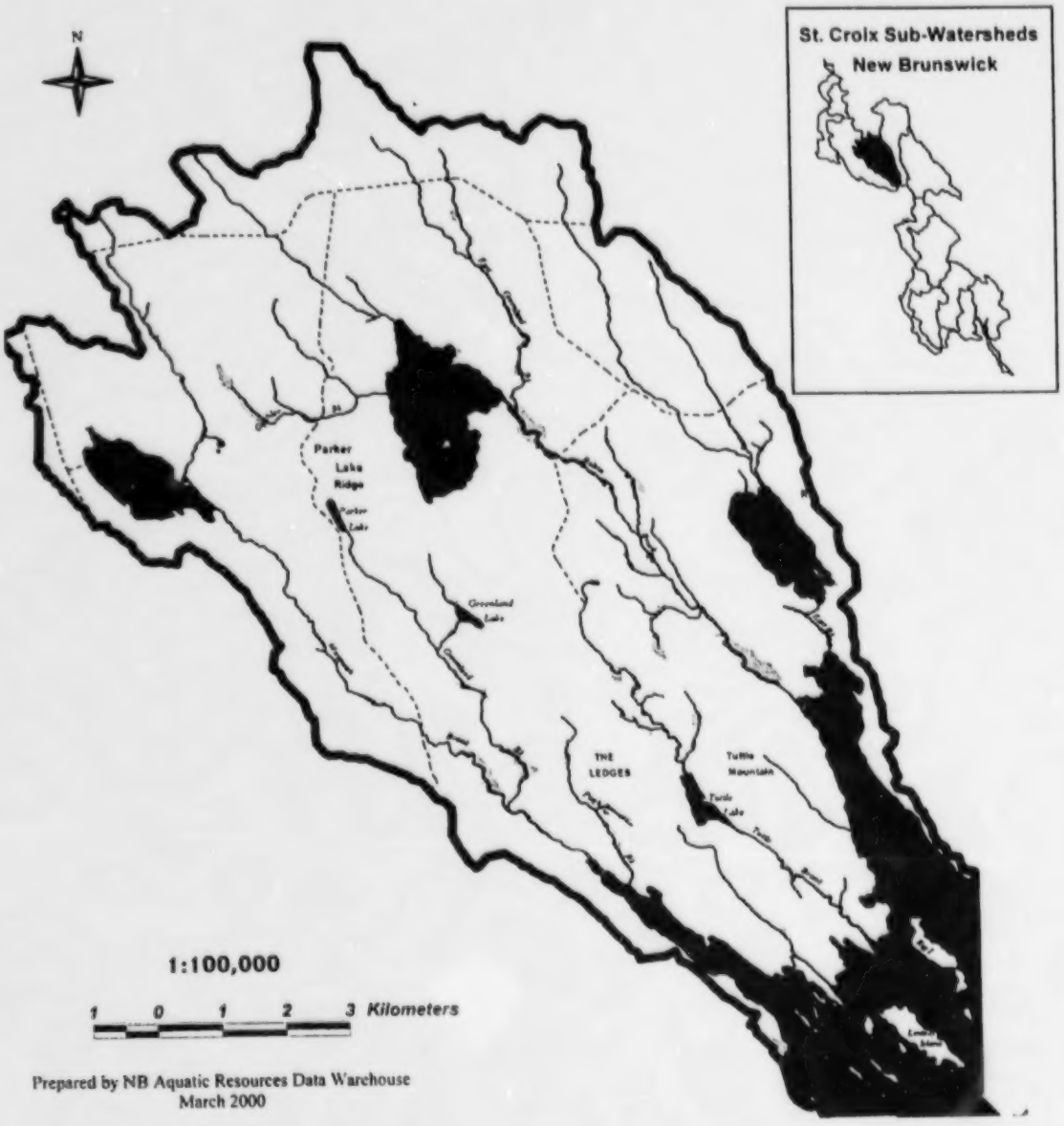
Class A for all waters in the Upper Spednic Lake Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance. *By 2002.*

Lower Spednic Lake Composite Sub-Watershed



Total drainage area: 125.9 km^2
Principal settlements: None
Principal waters: Musquash Lake, Musquash Brook, Tuttle Brook, Bolton Lake, Bolton Brook, East Brook Lake, East Brook, Greenland Brook

Description:

Spednic Lake and its immediate shoreline are discussed under Boundary Waters.

This subwatershed is almost exclusively Crown forest land, managed for commercial harvest. A primary haul road traverses the upper portion. A small number of camps are found on Bolton Lake.

Current status:

Principal land uses:

Forest (95%)

Principal land ownership:

Crown (99%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry

Water quality:

Sampled in 1999 at three stream sites [MUSQ1, EBRK1, BOLT1] and one lake site [BLTN1]. East Brook [EBKR1] showed lower alkalinity than most St. Croix waters but this is judged to be of natural causes (bedrock). All test results met Class A or AL criteria.

Water and/or fisheries studies on Musquash, East Brook and Bolton lakes indicate that these are mesotrophic (the last of these being high mesotrophic). The trophic status of the smaller lakes in this sub-watershed is unknown.

Future goals:

Commercial timber production is envisaged as the principal future land use.

Recommended preliminary classification:

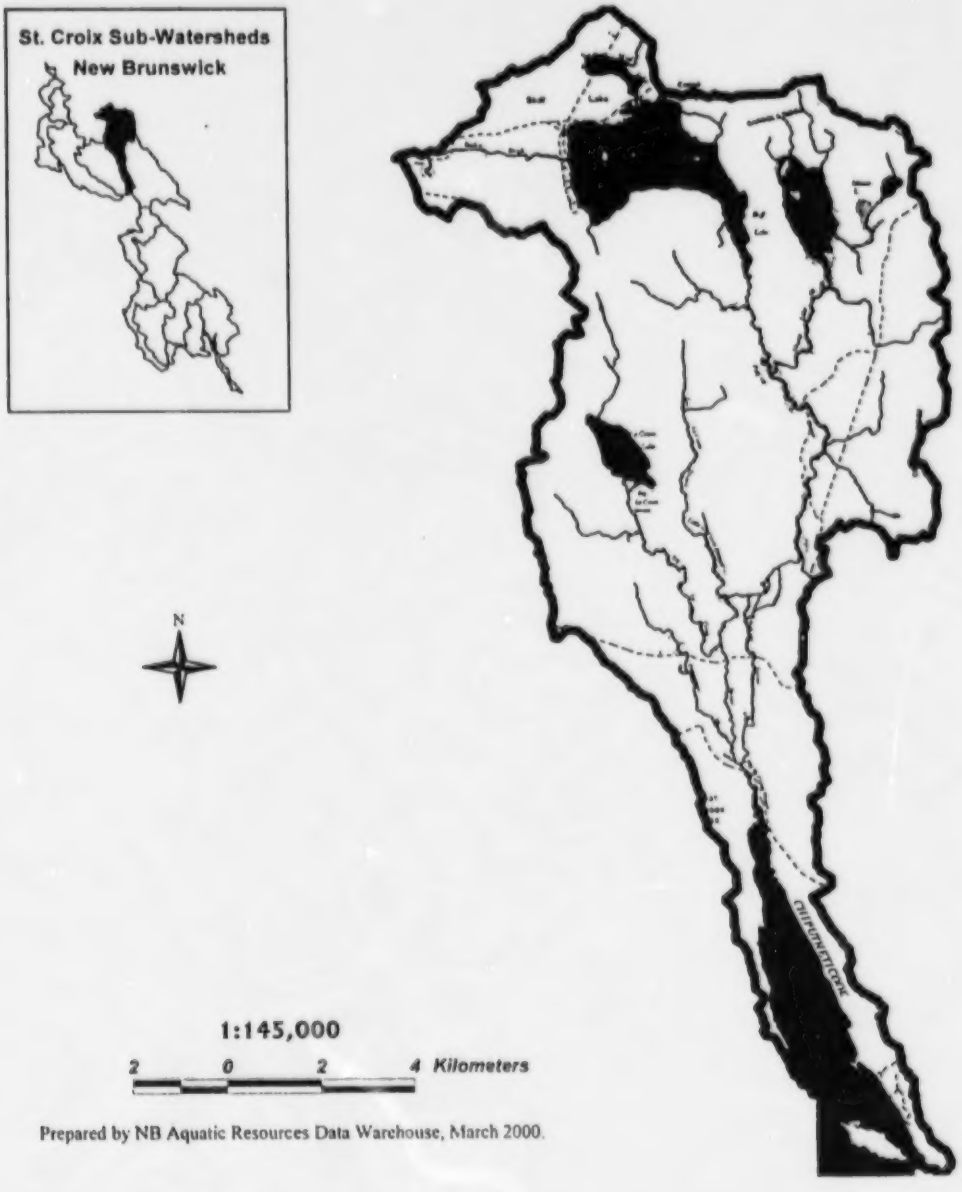
Class AL for all lakes and Class A for all other waters in the Lower Spednic Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance. *By 2002.*

Palfrey Lake Composite Sub-Watershed



Total drainage area: 138.7 km^2
Principal settlements: Skiff Lake
Principal waters: Skiff Lake, Palfrey Stream, Mud Lake, Grassy Lake, Grassy Lake Brook, LaCoote Lake, Big LaCoote Stream, Little LaCoote Stream, Dungarvon Brook

Description:

Palfrey Lake and its immediate shorelands are discussed under Boundary Waters. The majority of the Palfrey subwatershed is commercial forestland, with the exception of the Skiff Lake shoreline which has a traditional small-lot development of xxx seasonal and year-round residences along its north and west shores. The subwatershed is crossed by Route 122 near the headwaters, a major haul road near its base and an unpaved highway/ haul road on the east.

Skiff Lake and Grassy Lake are listed among the province's environmentally significant areas. Palfrey and LaCoote streams provide landlocked salmon spawning habitat in their upper reaches for their respective lakes and at their lower ends for fish from Palfrey Lake.

Current status:

Principal land uses:

Forest (93%), wetland (4%)

Principal land ownership:

Crown (52%), corporate forestry interests (42%), private small holdings (7%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, shorefront residences at Skiff Lake

Water quality:

Sampled in 1999 at one stream site [PAL1] and in 1998 at one lake site (SKIF1). On some occasions Palfrey Stream [PAL1] showed total organic carbon levels higher than average for the St. Croix, which are attributed to natural causes (wetlands). All test results met Class A or AL criteria.

Water and/or fisheries studies indicate that Skiff and LaCoote Lakes are oligotrophic and Grassy Lake is mesotrophic. The trophic status of two smaller lakes in this sub-watershed is unknown.

Future goals:

Commercial timber production within the watershed and waterfront residences on Skiff Lake are seen as the continuing principal land uses.

Recommended preliminary classification:

Class AL for all lakes and Class A for all other waters in the Palfrey Composite Sub-watershed.

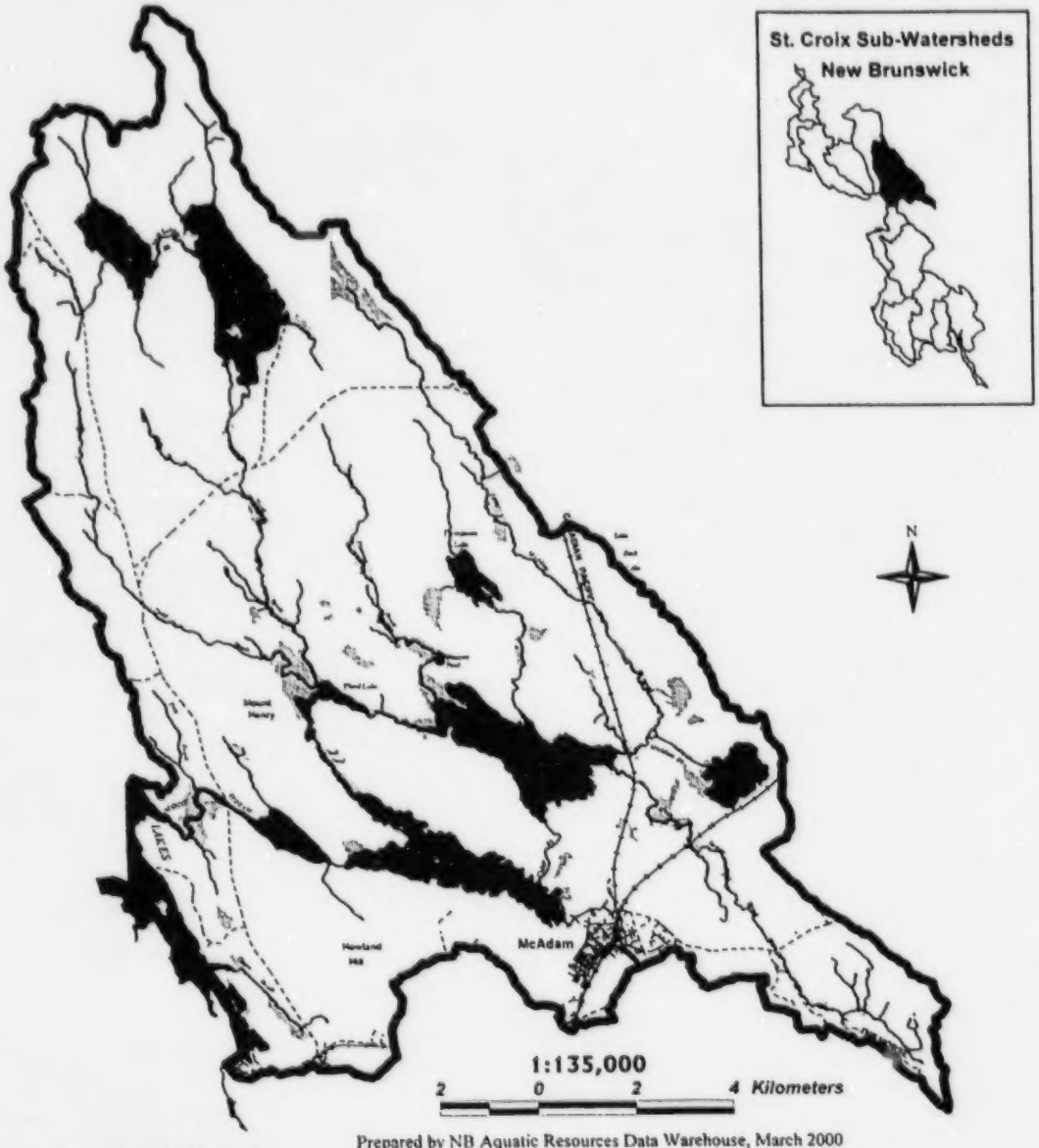
Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations.

★ Increase BMP use in road maintenance. *By 2002.*

★ Engage Skiff Lake shoreowners in a residential BMP program. *By 2002.*

McAdam Lakes Composite Sub-Watershed



Prepared by NB Aquatic Resources Data Warehouse, March 2000

Total drainage area: 197.0 km^2

Principal settlements: McAdam, St. Croix

Principal waters: Dead Brook, Sixth Lake, Fifth Lake, North Brook, Pleasant Brook, Thompsons Lake, Thompsons Brook, Little McAdam Brook, McAdam Brook, Foster Lake, White Beaver Brook, Modsley Lake, Colter Brook, Third Lake, Wauklahegan Lake, First Lake, Diggity Stream, Casey Brook

Description:

This is the largest sub-watershed in the St. Croix drainage. It includes a chain of eight inter-connected lakes and extensive wetlands nestled within commerial forestland, all of which drain to Spednic Lake via Diggity Stream, plus minor brooks which empty directly to the lower end of Spednic Lake downstream of Diggity. A major roadway (Route 4), an active rail line and the Village of McAdam lie at the southern end of this sub-watershed, near Wauklahegan Lake. A discontinued rail line extends northward from McAdam along the west side of the drainage and an unpaved highway and a number of larger haul roads cross various sections. A closed municipal dump on Route 4 lies near White Beaver Brook.

Diggity Stream and its associated wetlands are included in the provincial list of environmentally significant areas. Modsley Lake is one of two St. Croix lakes that has two outlets (one to Third Lake and another to Wauklahegan). A dam at the outlet of Third Lake helps to maintain the second outflow, which assists with water circulation at the east end of Wauklahegan Lake where there is a municipal outfall, a campground and residences. Two other small dams impound a short section of North Brook and maintain a large pond behind McAdam's historic railway station.

Current status:

Principal land uses:

Forest (90%), wetland (6%)

Principal land ownership

Crown (90%), private and municipal small holdings (7%)

Principal waters quality influences:

Point sources: licenced discharge from municipal wastewater treatment plant

Nonpoint sources: forestry, roads, rural residential, urban, closed dump

Water quality:

Sampled in 1999 at five stream sites [DEAD1, THIRD1, WBEAV1, MCAD1, DIGY1] and three lake sites [SIXTH1, FIFTH1, MODS1]. Sampled in 1998 at two lake sites [WAUK1, WAUK2]. McAdam and White Beaver Brooks [WBEAV1, MCAD1] showed above-average color, total organic carbon and iron and below-average alkalinity and pH, reflecting the characteristics of the extensive bogs which they drain. All test results met Class A or AL criteria.

Water and/or fisheries studies on Sixth, Fifth, Modsley, Wauklahegan and First lakes indicate that these are mesotrophic (the first two being high mesotrophic). The trophic status of the other lakes in this sub-watershed is unknown.

Future goals:

Commercial timber production within the watershed and municipal and industrial activities near the east end of Wauklahegan Lake are envisaged as the principal future land uses. Some additional lakefront cottage development can be anticipated.

Recommended preliminary classification:

Class C for discharge stream from McAdam wastewater treatment plant (outfall to mouth); Class AL for all lakes and Class A for all other waters in the McAdam Lakes

Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Maintain the flow of Colter Brook to Wauklahegan Lake to aid in lake circulation. *Ongoing.*

★ Establish a mixing zone for the McAdam treatment plant discharge. *On adoption of the Water Classification Regulation.*

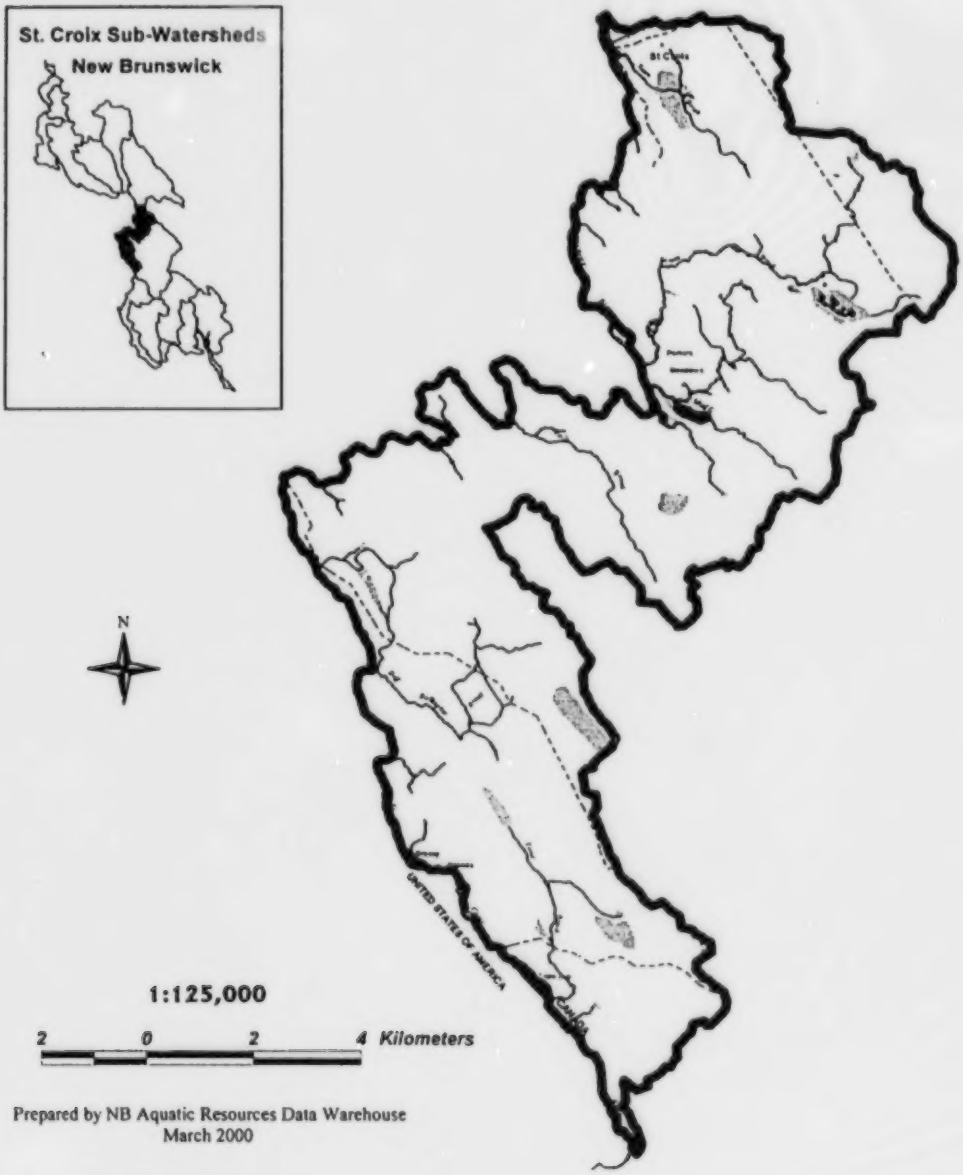
★ Increase BMP use in road maintenance and urban development. Test dump sites periodically for potential leaching. *By 2002.*

★ Develop an industrial BMP plan with the larger McAdam businesses which lie near wetlands or streams. *By 2003.*

★ Make capital improvements to McAdam's wastewater system to reduce treatment plant overflows after significant rainfalls. *By 2015.*

★ Manage any future development bordering on, or draining to, Wauklahegan Lake to minimize impacts on nutrient levels. Apply BMPs to any residential development on other lakes. *As warranted.*

Trout Brook Composite Sub-Watershed



Total drainage area: 92.6 km^2
Primary settlements: St. Croix
Primary sub-drainages: Sears Brook, Trout Brook (Porters Meadows), Mud Lake, Halls Brook, Rolf Rollingtier Brook, Trout Brook (Loon Bay)

Description:

This composite sub-watershed encompasses a number of smaller streams and wetlands which drain to the upper St. Croix River between the Vanceboro dam and the Canoose sub-watershed. It is almost exclusively utilized as commercial forestland. Outside of limited shorefront development along the boundary waters (addressed under that section) the area is marked only by occasional camps or residences along the Loon Bay and Beaconsfield roads and Route 630, which lie along the edge of the drainage, and by haul roads.

Current status:

Principal land uses:

Forest (90%), wetland (7%)

Principal land ownership:

Crown (93%), private small holdings (7%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, roads

Water quality:

No sites were tested within this sub-watershed.

Future goals:

Commercial timber production is envisaged as the principal future land use.

Recommended preliminary classification:

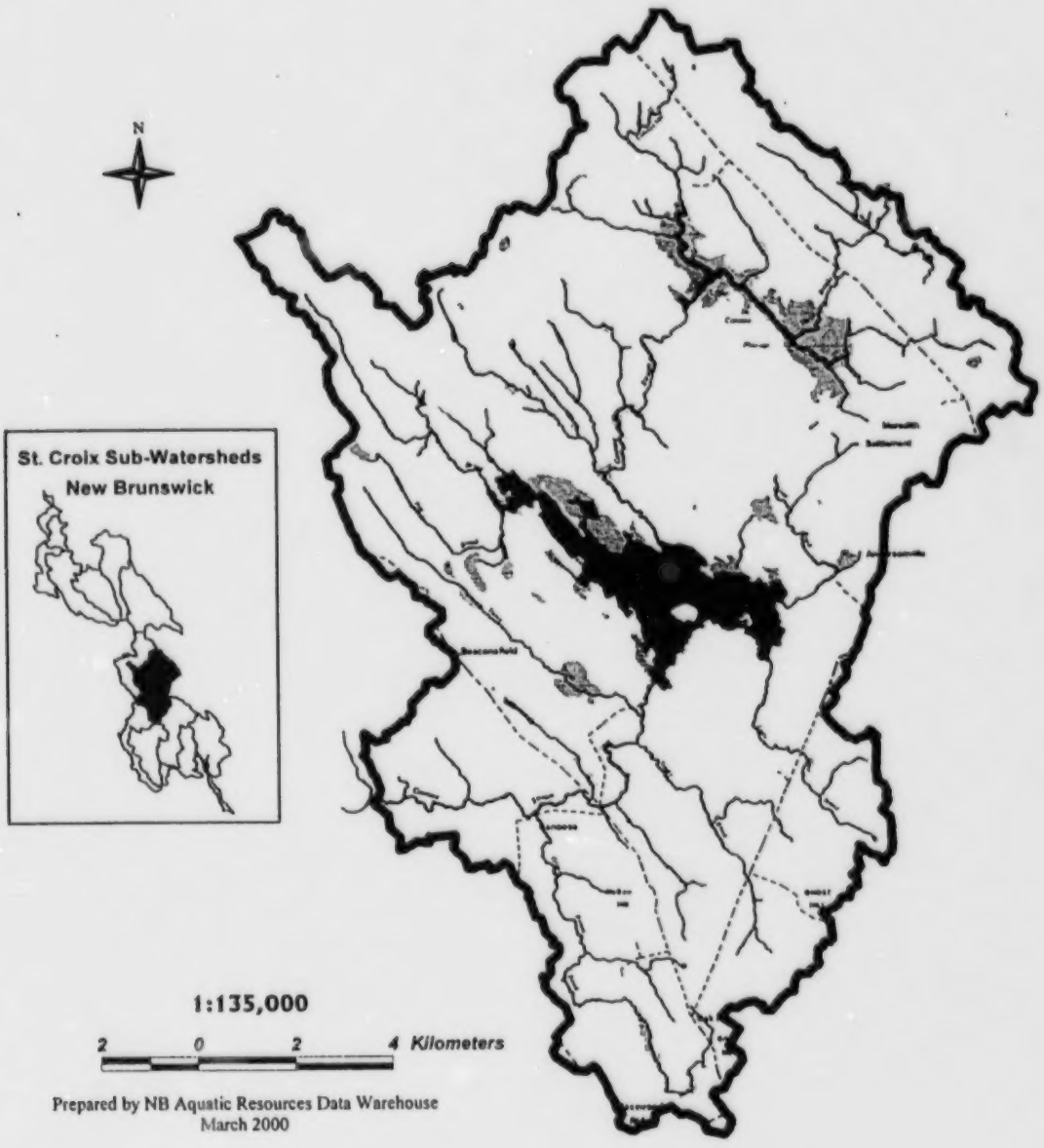
Class AL for Mud Lake and Class A for all other waters in the Trout Brook Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance. *By 2002.*

Canoose Stream Sub-Watershed



Total drainage area: 194.1 km^2
Principal settlements: Canoose, Oak Hill, Andersonville, Meredith Settlement
Principal waters: Canoose Stream, Canoose Flowage, Goat Brook, Little Goat Brook, Sandy Brook, Green Brown Brook, Shaws Brook

Description:

This is the second largest sub-watershed in the St. Croix drainage, consisting of two large, impounded wetlands (Canoose Flowage and Upper Canoose Flowage) and a number of small streams which drain to the Canoose Stream and then to the St. Croix River. A major roadway (Route 630) crosses the top of the sub-watershed to the east, other rural roadways cross the south and east sides and a haul road skirts the north border.

Commercial forestry is the primary activity, although rural residences and some small farms are found along the roadways. Much of this sub-watershed is included in the provincial list of environmentally significant areas, in four separate listings (Three Brooks Marsh, Canoose Flowage, Andersonville Bog and Canoose Stream). Canoose Stream is home to a provincially-rare species of freshwater crayfish and a new species of dragonfly first identified in 1997.

A water control dam impounds Canoose Flowage and two Ducks Unlimited structures raise the waters of the Upper Canoose Flowage and upper Green Brown Brook.

Current status:

Principal land uses:

Forest (86%), wetland (11%)

Principal land ownership:

Crown (93%), private small holdings (7%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, roads

Water quality:

Sampled in 1999 at two stream sites [CAN1, CAN2] and in 1998 at one lake site [CNOSE1]. All test results met Class A or AL criteria.

Water quality and fisheries studies indicate that Canoose Flowage borders between mesotrophic and eutrophic status. It has higher values for many water quality parameters due to the natural influences of marshes and bedrock.

Future goals:

Commercial timber production is envisaged as the continuing principal land use. Residential development is expected to continue along Canoose Stream and the main roadways.

Recommended preliminary classification:

Class AL for Canoose Flowage and Class A for all other waters in the Canoose Stream sub-watershed.

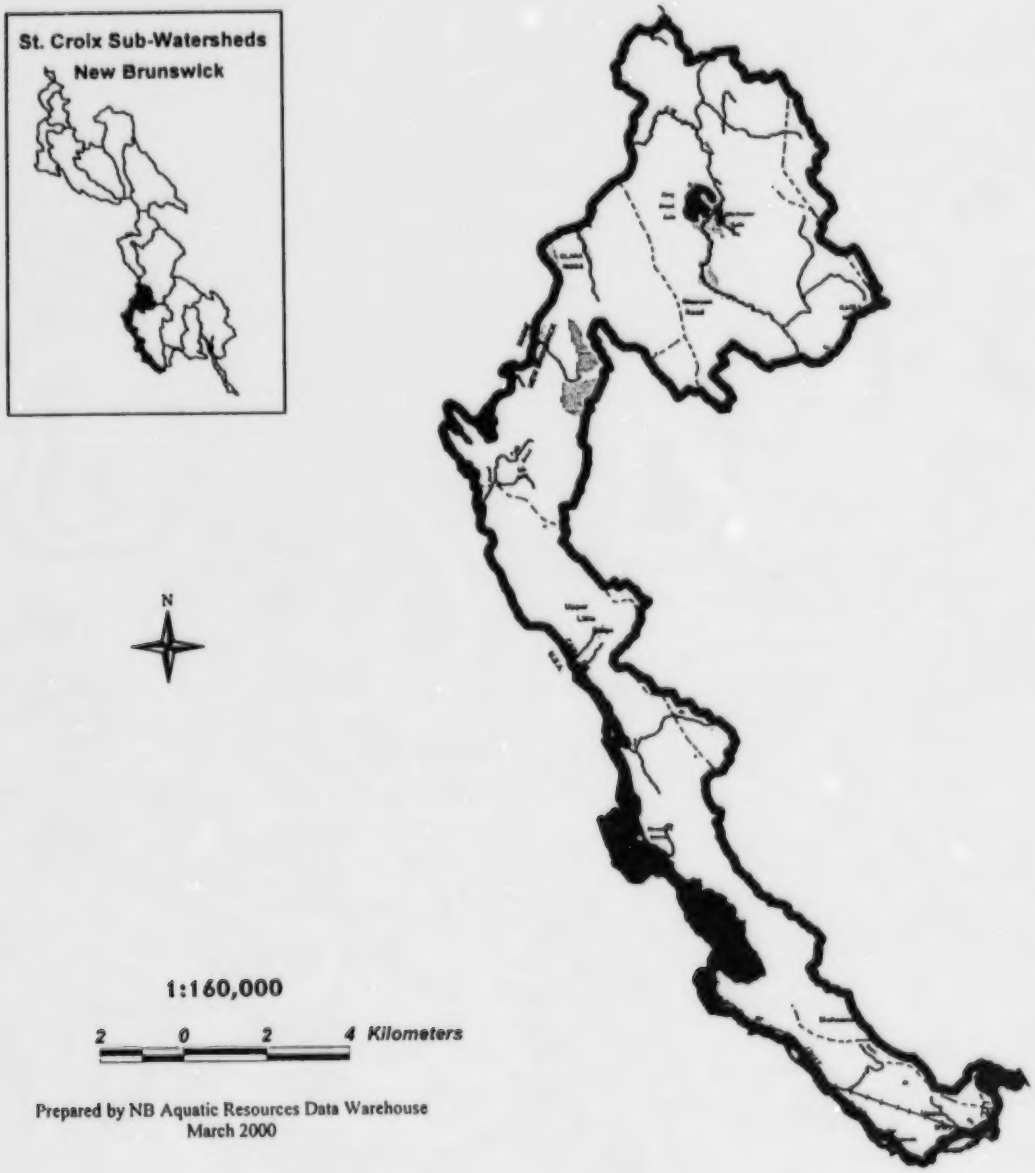
Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance and residential development. *By 2002.*

★ Implement management measures to protect resources identified in the environmentally significant areas listings. *By 2003.*

King Brook Composite Sub-Watershed



Total drainage area: 90.7 km^2
Principal settlements: Basswood Ridge, Little Ridge, Upper Mills
Principal waters: King Brook Lake, King Brook, Ash Brook

Description:

This composite sub-watershed includes all waters draining to a 40km section of the St. Croix River between the Canoose and Mohannes sub-watersheds. The upper third of this sub-watershed is characterized by lowlands and marshes, predominated by King Brook Lake and King Brook. After Grand Falls, there is a shift to the height of land and short streams of Little Ridge area, continuing to Upper Mills. A number of rural roadways skirt portions of this drainage, providing a focus for rural residences and some small farming and blueberry ground. At the lower end of the sub-watershed, the community of Upper Mills and a section of active rail line lie along the St. Croix River.

King Brook Lake, which is impounded by a Ducks Unlimited dam, is included on the provincial list of environmentally significant areas.

Land ownership and use patterns begin a transition in this sub-watershed which will predominate in the lower section of the St. Croix system: most of the land is privately owned and a small but growing percentage is used for activities other than forestry.

Current status:

Principal land uses:

Forest (91%), wetland (4%), agriculture (3%)

Principal land ownership:

Private small holdings (68%), Crown (32%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry

Water quality:

Sampled in 1999 at one site [KING1], with test results meeting Class A criteria. King Brook Lake was not sampled nor was its trophic level assessed.

Future goals:

Commercial timber production is envisaged as the principal future land use. Rural residential development is expected to continue along Rte 725 and agriculture (principally small farming and blueberry growing) is anticipated to remain at current levels. Within the next few years a new international highway crossing may be sited in the lower section of this sub-watershed and recent gold exploration may lead to mining developments, however the potential impacts of these, if any, cannot be anticipated at this time.

Recommended preliminary classification:

Class AL for King Brook Lake and Class A for all waters in the King Brook Composite sub-watershed.

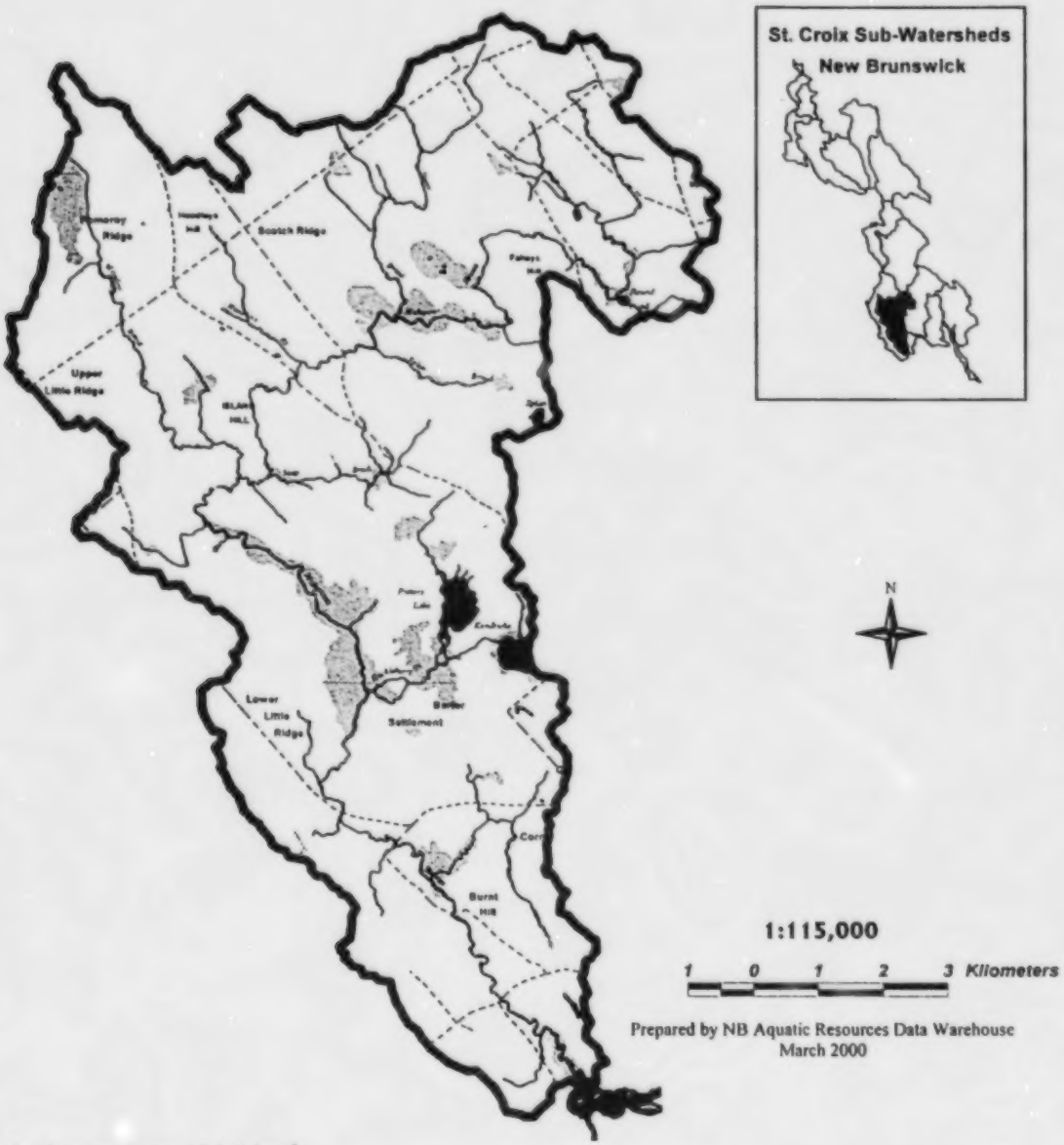
Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance, residential development, agriculture. *By 2002.*

★ Apply the province's Environmental Impact Assessment process to any highway or mining development. *As warranted.*

Mohannes Stream Sub-Watershed



Total drainage area: 125.0 km^2
Principal settlements: Mohannes, Little Ridge, Burnt Hill, Barter Settlement, Scotch Ridge, Pomeroy Ridge
Principal waters: Kendricks Lake, Potters Lake, Mohannes Stream, Huckleberry Brook, Meadow Brook, Hoodleys Brook, Stuart Brook

Description:

This sub-watershed, like the Dennis, Gallop and Waweig drainages to the east, originates in the granite and granite-sediment remains of an ancient mountain ridge and flows through marshlands, forest, old farmland and rural residential settlements to the St. Croix River. Rural highways and roadways criss-cross the Mohannes Stream and its tributaries at intervals, but rarely parallel them -- as a result limited development has occurred immediately adjacent to these waters. However two closed municipal dumps are located within the watershed, both in proximity to streams.

Kendricks Lake and the portion of Mohannes Stream between Routes 735 and 740 are included on the provincial list of environmentally significant areas. The lower sections of Mohannes Stream provide habitat for an exceptional number of dragonfly species.

Current status:

Principal land uses:

Forest (90%), agriculture (3%), wetland (3%)

Principal land ownership:

Private small holdings (78%), Crown (20%)

Principal water quality influences:

Point sources: none

Nonpoint sources: forestry, rural residential, roads, agriculture, closed dumps

Water quality:

Sampled in 1999 at three stream sites [MOH1, MOH2, MOH3]. These show higher levels of aluminum, arsenic, iron, sulphates and zinc, all attributable to bedrock influences. All test results met Class A criteria.

The trophic status of the lakes in this sub-watershed was not assessed.

Future goals:

Commercial timber production is expected to remain as the primary land use. Rural residential growth is expected to accelerate along road corridors and agriculture (principally small farming) is anticipated to remain at current levels. Within the next few years a new international highway crossing may be sited in the lower section of this sub-watershed and recent gold exploration may lead to mining developments, however the possible impacts of these, if any, cannot be anticipated at this time.

Recommended preliminary classification:

Class AL for all lakes and Class A for all other waters in the Mohannes Stream sub-watershed.

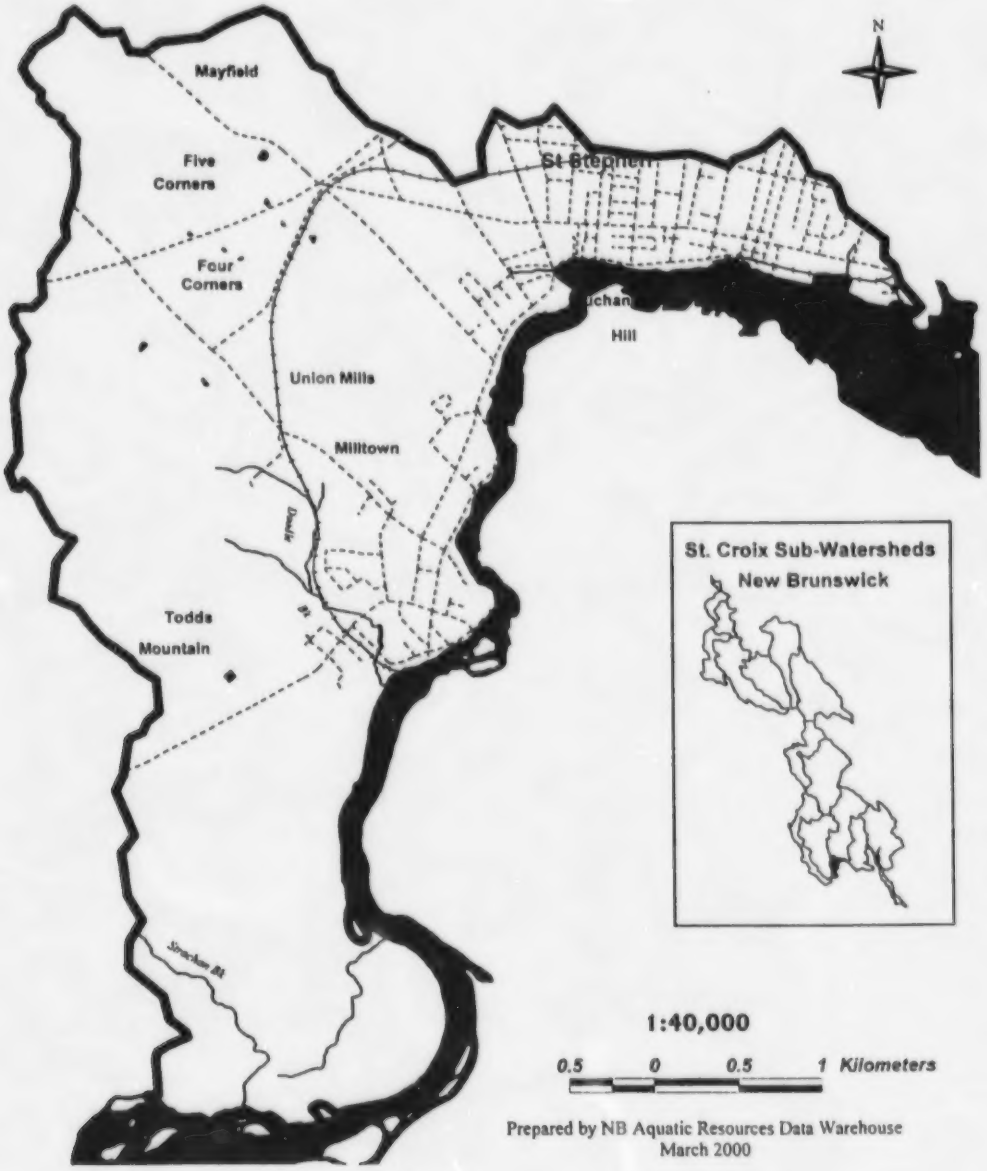
Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance, residential development and agriculture. Test dump site periodically for potential leaching. *By 2002.*

★ Apply the province's Environmental Impact Assessment process to any highway or mining development. *As warranted.*

Strachan Brook Composite Sub-Watershed



Total drainage area: 15.4 km^2
Principal settlements: Milltown, St. Stephen, Mayfield
Principal waters: Strachan Brook, Doodle Brook, Tan House Brook

Description:

This composite is the smallest and most densely developed sub-watershed in the St. Croix system. It encompasses short streams draining to the St. Croix River between the Mohannes and Dennis sub-watersheds, over a land base that varies from rural forestland to the urban and industrial sections of St. Stephen, the St. Croix's largest municipality. A major East Coast highway that passes through the lower section is scheduled to be re-routed through the middle of the sub-watershed in the future; an active rail line bisects the area now.

The streams in this sub-watershed show influences of the metal-laden volcanic bedrock in the St. Stephen area. The largest streams have also been influenced by development. Strachan Brook runs through uninhabited field and woodland outside of St. Stephen but has its source at the foot of a large, recently-closed municipal landfill. Doodle Brook flows through the St. Stephen industrial park, urban residential neighborhoods and an active rail line, before discharging through a small marsh to the St. Croix -- receiving the outfall of a number of municipal storm drains en route. Tan House Brook also runs through industrial and urban residential properties, receiving licenced discharges of industrial cooling water and municipal wastewater (the latter from the Milltown treatment plant) and the leachate of a closed industrial dump site.

Current status:

Principal land uses:

Forest (55%), urban (22%), industrial (11%)

Principal land ownership:

Private small holdings (87%), Crown (7%), municipal (4%)

Principal water quality influences:

Point sources: licenced discharges from a municipal wastewater treatment plant and an industrial cooling water line, municipal storm drains

Nonpoint sources: urban and industrial development, roads, closed dumps

Water quality:

This was sampled in 1999 at three sites: Doodle Brook [DOOD2] at low flow and Tan House Brook [TAN1, TAN2] at low and high flow for *e. coli* and high flow for other parameters. Both streams show increased values for calcium, iron, magnesium and conductivity that can be attributed to bedrock influences. Doodle has elevated ammonia and turbidity which may be due to human influences. Tan House has elevated levels of aluminum, naturally-occuring, and increased levels of potassium, nitrate, nitrogen and ammonia which can be attributed primarily to human impacts. Bacteria levels at both Tan House sites well exceeded Class C criteria at high flow, especially at the site below the treatment plant, which bypasses its excess inflow at such times.

Strachan Brook was not sampled.

Future goals:

Increased industrial and residential development will occur around Doodle and Tan House Brooks and likely extend to Strachan Brook. A major highway corridor will continue to grow around St. Stephen, across this sub-watershed.

Recommended preliminary classification:

For Doodle Brook, Class C from the Bell Subdivision to the mouth. For Tan House Brook, Class C from St. Stephen Drive (or the future Highway 1) to the mouth. Class B for all other waters in the Strachan Brook Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Develop a rehabilitation and Best Management Practices (BMP) plan for Doodle Brook to restore more natural character through the industrial park and reduce stormwater impacts in lower sections. *By 2002.*

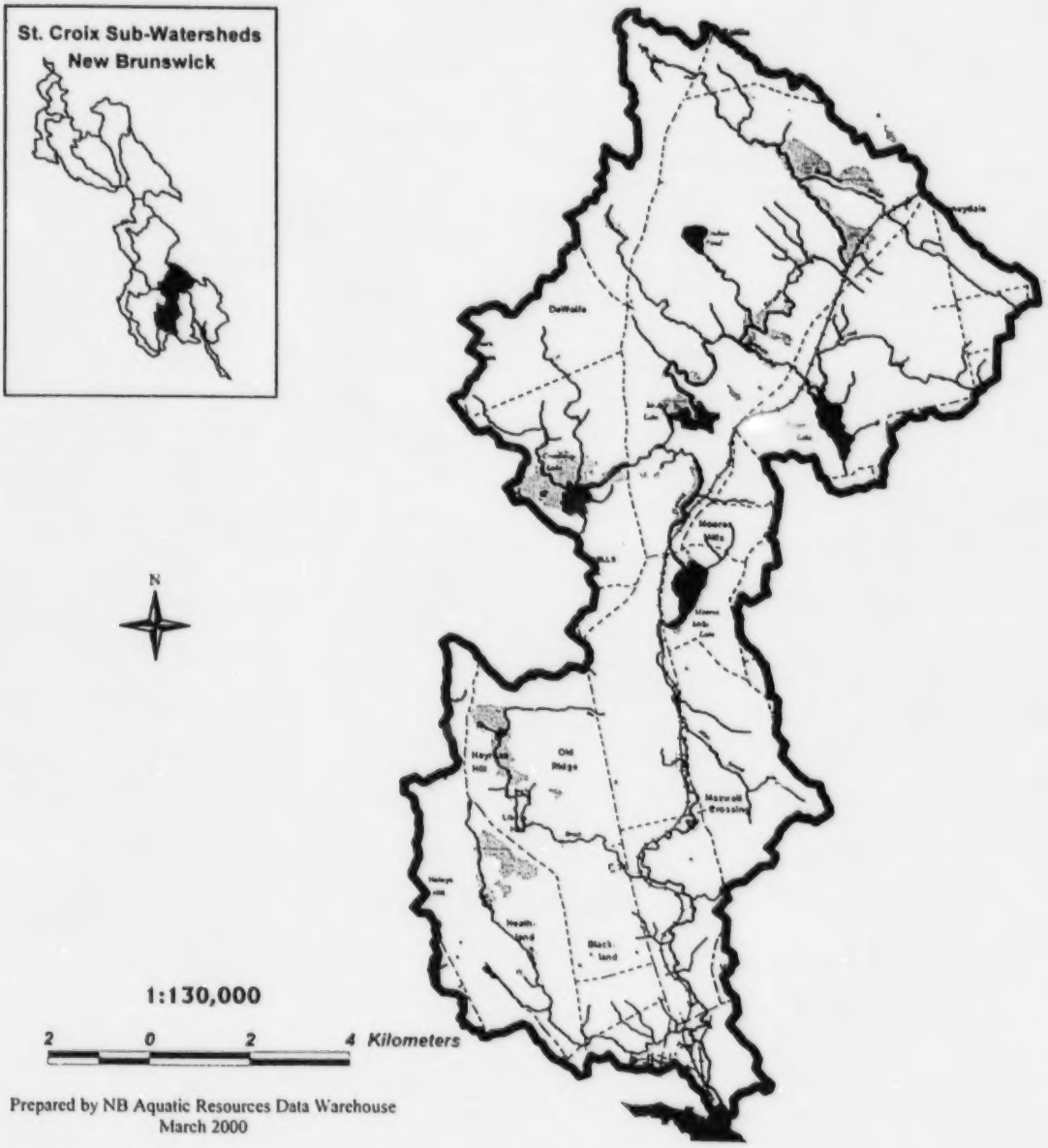
★ Increase BMP use in road development and maintenance. Test dump sites periodically for potential leaching. *By 2002.*

★ Make capital improvements to St. Stephen's wastewater system to eliminate bypassing by the Milltown treatment plant. *By 2010.*

★ For Tan House Brook, redirect dump leachate into the municipal wastewater system for treatment when municipal wastewater infrastructure is upgraded. *By 2010.* Maintain brook shade cover. *Ongoing.*

★ Apply BMPs to future residential and infrastructure developments in this sub-watershed. *As warranted.*

Dennis Stream Sub-Watershed



Total drainage area: 135.1 km^2
Principal settlements: St. Stephen, Heathland, Old Ridge, Maxwell Crossing, Moores Mills, DeWolfe, Honeydale, St. David Ridge, Baillie
Principal waters: Malkeson Brook, Dunham Brook, Foster Lake, Middle Lake, Cranberry Lake, Moores Mills Lake, Bush Brook, Billy Weston Brook

Description:

The Dennis Stream sub-watershed reflects both rural and urban uses. Historically it supported forestry and small farming but this has been shifting gradually toward business and residential development along the major roadways, notably Routes 3 and 750, as an extension of the greater St. Stephen area. These highways and an active rail line run nearly the full length of the drainage, the latter paralleling Dennis Stream for much of its course.

The Town of St. Stephen depends upon the upper two thirds of this sub-watershed for its drinking supply. As a result, land and water uses in this portion of the drainage are managed for this purpose and will automatically receive Class AP status in the water classification program. Residential, business and small farming activities predominate along main roadways in this area. Ducks Unlimited dams impound Cranberry and Middle Lakes and other small structures expand marshlands immediately below these. Closed rural dumps are located near the waters of Billy Weston Brook below St. Stephen Drive and near Dennis Stream above Moores Mills Lake.

The lower third of the watershed includes areas of urban and commercial development as well as field and forest. Most impacted by human activity is Billy Weston Brook, which is affected by runoff from street storm drains, a shopping mall, a main highway, a gas station, a road maintenance depot and a number of businesses within a ½km segment near its mouth. Dennis Stream itself has felt the influence of increased residential and business development and, in 1999, the in-progress relocation of a major highway.

Dennis Stream supports a sea-going run of gaspereau and a small, historic run of Atlantic salmon, a fish which is nearing endangered status in Canada. A bog in the Baillie Settlement area is included on the provincial list of environmentally significant areas.

Current status:

Principal land uses:

Forest (80%), agriculture (8%), wetland (7%)

Principal land ownership:

Private small holdings (88%), Crown (10%)

Principal water quality influences:

Point sources: municipal storm drains

Nonpoint sources: urban, roads, rural residential, agriculture, closed dumps

Water quality:

Sampled in 1999 at three primary sites on the mainstem (DEN1, DEN2, DEN5] and two primary sites on Billy Weston Brook [BILL1, BILL2], plus three *e. coli* exploratory sites on these waters.

The lower reaches of Billy Weston Brook showed notably elevated values for 21 of 30 tested parameters -- including metals, nitrates, sulphates and bacteria -- which were not evident in upstream samples. All of these have probable sources in road, business and urban impacts within a short stream segment. Samples taken at the mouth of Dennis Stream appeared to show the residual effects of the Billy Weston inflow for six of these parameters and failed to meet Class A criteria for *e. coli* on two of five occasions. Samples taken above the Billy Weston inflow met Class A criteria in all instances.

The trophic status of the lakes in this sub-watershed was not assessed.

Future goals:

In the upper part of this sub-watershed, rural land use for forestry, small farming and homes will continue to predominate. Business and residential development is expected to increase particularly along Routes 3 and 750. Above Maxwell Crossing, where the Town of St. Stephen draws its municipal water supply, the highest priority will continue to be drinking water quality. All of the waters and shorelands in the Dennis drainage above this point will remain under the protection of the N.B. Water Quality Regulation program.

At the lower end of the sub-watershed, there is the potential for eventual conversion of older farm fields and woodlands to residential or even industrial development serving the greater St. Stephen area. This trend is expected to be a slow, allowing time to plan land use to include stream protection. Urban impacts on the lower section of Billy Weston Brook are seen as unavoidable but can be reduced through best management practices (BMPs).

Recommended preliminary classification:

Required Class AP for all lakes and other waters in the Dennis sub-watershed above Maxwell Crossing.

For Billy Weston Brook, Class B from St. Stephen Drive (soon new Highway #1) to Brook St. and Class C from Brook St. to mouth. For Dennis Stream, Class B from Billy Weston Brook to mouth.

Class A for all other waters in the Dennis sub-watershed.

Recommended action:

★ Continue to protect the Class AP status (drinking supply) waters of the Dennis sub-watershed above Maxwell Crossing under the N.B. Water Quality Regulation program. *Ongoing.*

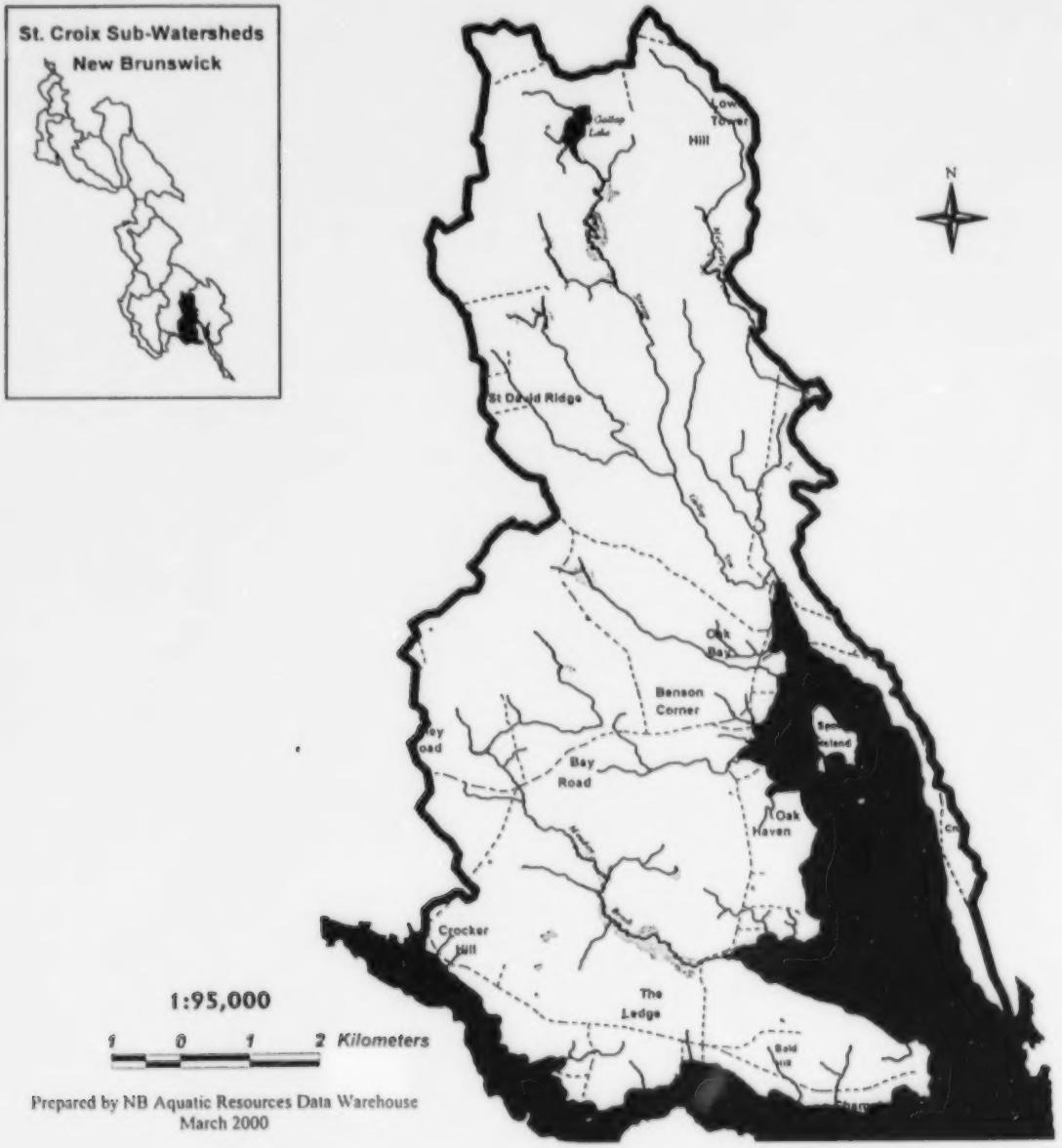
★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Develop and implement a multi-faceted BMP plan for the lower section of Billy Weston Brook to reduce the impacts of roads and parking lots, stormwater and commercial and residential uses. Identify and correct the source of the high *e. coli* counts observed in 1999. *By 2002.*

★ Increase BMP use in road maintenance, residential development and agriculture throughout the sub-watershed. *By 2002.*

★ Manage future land and water use of Dennis Stream below Billy Weston Brook to maintain high water quality for sea-run and resident fish populations. *As warranted.*

Gallop Stream Composite Sub-Watershed



Total drainage area: 76.4 km^2
Principal settlements: Crocker Hill, The Ledge, Champlain, Bay Road, Bensons Corner, Oak Bay, St. Davids Ridge
Principal waters: Meadow Brook, Gallop Stream, Gallop Lake

Description:

The Gallop Stream Composite sub-watershed includes over 16 streams that empty to the St. Croix River downstream of Dennis Stream or to Oak Bay. The largest of these are Gallop Stream and Meadow Brook which together drain roughly 75% of the composite.

Old Highway 1 crosses the lower half of the watershed and is a focus of service, retail and small manufacturing businesses along with homes, a trailer park, a small airport and a campground. A new express Highway 1 is under construction on a parallel route just to the north of it. Roads along the shoreline serve residential properties, a golf course, small farms and a concentration of sand and gravel pits.

The upper portion of the watershed is predominantly forest, with some traditional small farms, some residences and limited road access.

Current status:

Principal land uses:

Forest (77%), agriculture (11%), rural residential or business (4%), wetland (4%)

Principal land ownership:

Private small holdings (85%), corporate forestry interests (7%), Crown (7%)

Principal water quality influences:

Point sources: licensed trailer park wastewater plant discharge, licenced park wastewater plant discharge. [licenced hatchery discharge goes to estuary at Oak Bay].

Nonpoint sources: rural residential and business, roads, agriculture, forestry

Water quality:

Sampled in 1999 at six sites [MEAD1, MEAD4, HAT1, BENS1, PARK1, GALL1]. Streams in the lower portion of the sub-watershed generally showed a mix of effects from sulphide mineralization and limestone in bedrock (i.e. higher levels of alkalinity, calcium, chloride, chromium, potassium, manganese, sodium, sulphates, hardness and conductivity) that were not evident in the Gallop Stream samples from further north.

A segment of Meadow Brook in the vicinity of old Highway 1 receives the effluent from a small wastewater treatment plant which has elevated *e. coli* counts and also runoff from the highway, a gas station/restaurant and truck parking lot before flowing into an extensive marsh. The brook at Benson's Corner is visibly impacted between the highway and Oak Bay by concentrated residential development and an animal feedlot. The stream at Oak Bay Park receives the discharge from the park treatment plant just above head-of-tide. The influences of these activities are observed in water samples from these sites.

Future goals:

In time, residential and business development can be expected to infill open areas in the lower part of the watershed, with the exception of the Meadow Brook marshlands. A major new highway will twin the existing primary roadway across this area.

Use patterns in the upper portion of the watershed are not expected to vary significantly, unless mineral exploration now underway across the southern part of the St. Croix watershed reveals a major gold or other metal find in this area.

Recommended preliminary classification:

Class B for Meadow Brook between the East Coast Village treatment plant inflow and a point 250m below Old Bay Road and for Benson's Corner Brook below old Highway 1. Class C for the brook at Oak Bay Park below the treatment plant inflow.

Class AL for Gallop Lake.

Class A for all other waters in the Gallop Stream Composite sub-watershed.

Recommended action:

★ Continue to implement Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Continue to maintain the Oak Bay Park treatment plant to minimize *e.coli* discharge to Oak Bay clam flats. *Ongoing.* [Note: this site is ineligible for a mixing zone as these are not proposed for the mouths of watercourses].

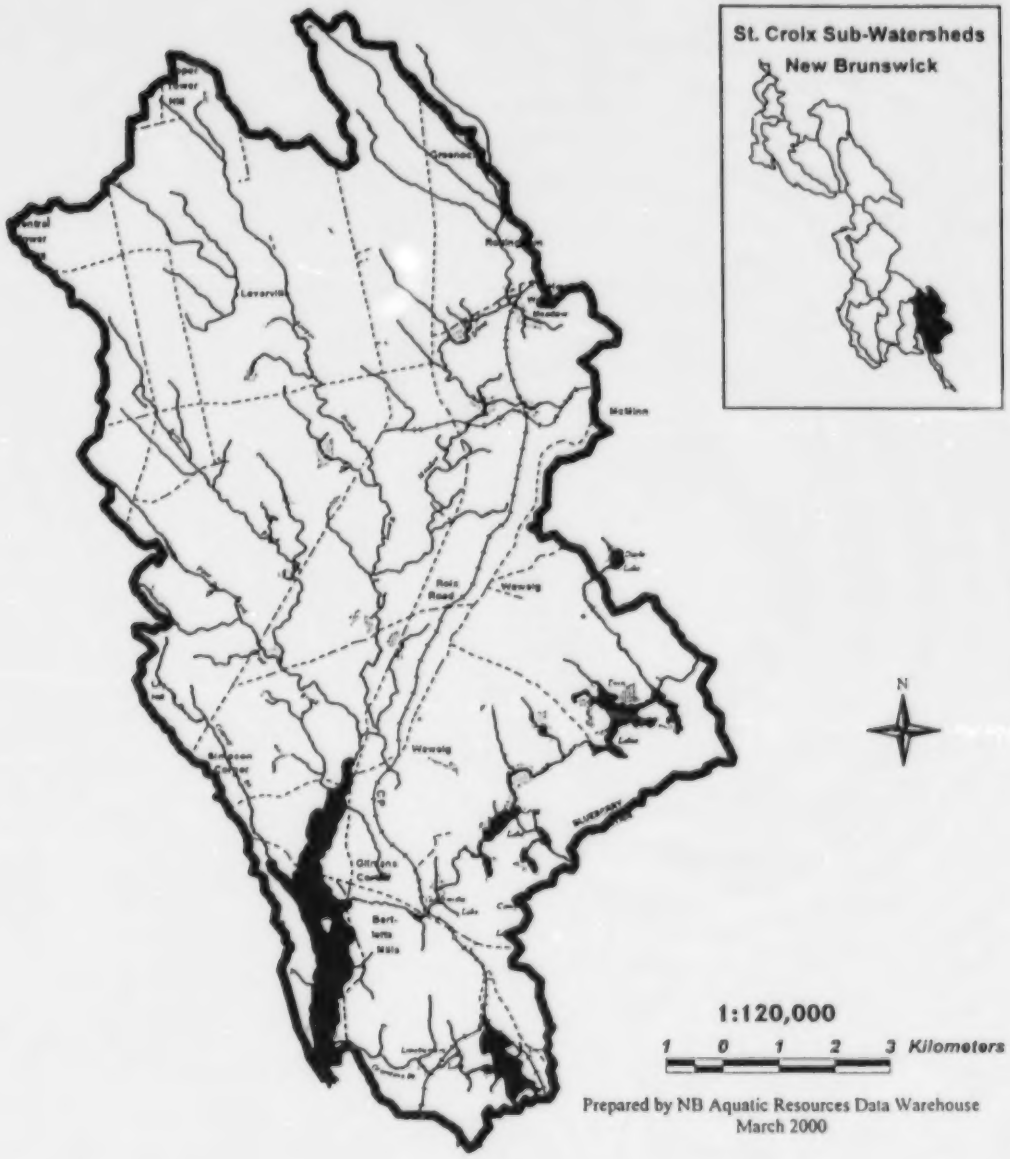
★ Increase BMP use in road maintenance, residential development, agriculture and also business operations along Highway 1. *By 2002.*

★ Rehabilitate degraded segments of the brook at Benson's Corner below Highway 1, remove debris and maintain minimal shore buffers along these waters. *By 2002.*

★ On Meadow Brook, explore options for a trailer park treatment plant upgrade to reduce *e. coli* levels; apply BMPs and shore buffering along truck stop parking lot. *By 2003.* Establish a mixing zone for the treatment plant discharge. *On adoption of the Water Classification Regulation.*

★ Apply the province's Environmental Impact Assessment process to any mining development. *As warranted.*

Waweig River Sub-Watershed



Total drainage area: 133.5 km^2
Principal settlements: Waweig, Tower Hill, Roix Road
Principal waters: Waweig River, Pout Brook, Berry Brook, Sawyer Brook, Meadow Brook, Twin Lakes, Long Lake, Goldsmiths Lake, Goldsmiths Stream, Limeburners Lake, Greenlaws Brook

Description:

The Waweig sub-watershed represents a combination of traditional and newer land uses. While it is primarily forest, the balance of the lands reflect a mix of small agriculture, rural residential or business use and infrastructure that has evolved differently from the other sub-watersheds.

With perhaps the exception of the Dennis Stream sub-watershed, much of which is protected as a designated drinking water supply, the Waweig River sub-watershed shows the most intensive combined use for small woodlots, small farming and roadside development along watercourses. Major highways 127 and 1 (the latter now being duplicated by a new express highway) both cross the watershed, as do a good number of rural roadways. An abandoned rail line with redevelopment potential runs the length of the drainage.

Much of the drainage lies on top of metal-rich bedrock that has recently come under exploration for gold and other elements. Short-lived (1997-1999) disposal sites for septage and fish waste near the intersections of the Waweig River and Pout Brook have been the subject of intense debate over groundwater and surface water impacts. Two now-closed rural dumps and an extended, 200 year-old sawmill complex are also found in the lower regions, as is a small salmon hatchery. Small dams impound the Twin Lakes and Goldsmiths Lake.

The upper section of the drainage is criss-crossed by roads which support a proliferation of small woodlots under harvest, small farming operations and rural residences, as well as a major egg producer.

The Waweig River maintains a small, historic population of sea-run gaspereau and also Atlantic salmon (the latter nearing endangered status in Canada) and includes a 5km long tidal segment which can be affected by inflow from an adjacent marine port and industrial park. The river itself and the Twin Lakes in the lower part of the watershed are included in the provincial list of environmentally significant areas.

Limeburners Lake, at the southernmost end of the sub-watershed, is unique in that it has outlets which drain to separate watersheds: Chamcook and St. Croix. The Chamcook watershed (not part of this study) is a designated drinking supply serving the Town of St. Andrews, hence the lake and a portion of its St. Croix outlet, Greenlaws Brook, will receive automatic protective classification.

Current status:

Principal land uses:

Forest (84%), agriculture (7%), wetland (4%), roads/utilities (3%)

Principal land ownership:

Private small holdings (85%), corporate forestry interests (7%), Crown (7%)

Principal water quality influences:

Point sources: a licenced hatchery discharge

Nonpoint sources: roads, agriculture, forestry, closed dumps, rural residential and business uses

Water quality:

Sampled in 1999 at six sites [POUT2, WAW1, WAW3, GOLD1, GOLD 2, GRLAW1] and 1999 N.B. Dept of the Environment data referenced for five sites. While the chemical parameters showed no outstanding trends for this sub-watershed and qualified the

waters for Class A status, the *e. coli* counts varied, giving some values in the Class B range at sites along the entire system. It is unclear as to whether these counts were of natural or human-caused origin and there was insufficient time to research the matter adequately in the course of this full watershed study.

Limeburners Lake is oligotrophic; the trophic status of the other lakes in this sub-watershed was not assessed.

Future goals:

This sub-watershed is at a crossroads. The impacts of small woodlot harvesting and farming, the potential for commercial mining and unresolved issues regarding waste disposal sites all compound the other development trends that the Waweig shares with the surrounding areas.

The interests within this sub-watershed need to have more information on *e. coli* sources and make land and water use decisions based upon these and other trends. Nearly all of the waters in this sub-watershed could be Class A, if local interests support this classification.

Recommended preliminary classification:

Class AP for Limeburners Lake and for Greenlaws Stream between Limeburners Lake and the railway line. Class AL for all other lakes.

Formal classification of the remaining waters of this sub-watershed be reserved pending further study and consultation.

Recommended action:

★ Continue to protect the Class AP status (drinking supply) waters of Limeburners Lake and portions of Greenlaws Brook under the N.B. Water Quality Regulation program. *Ongoing.*

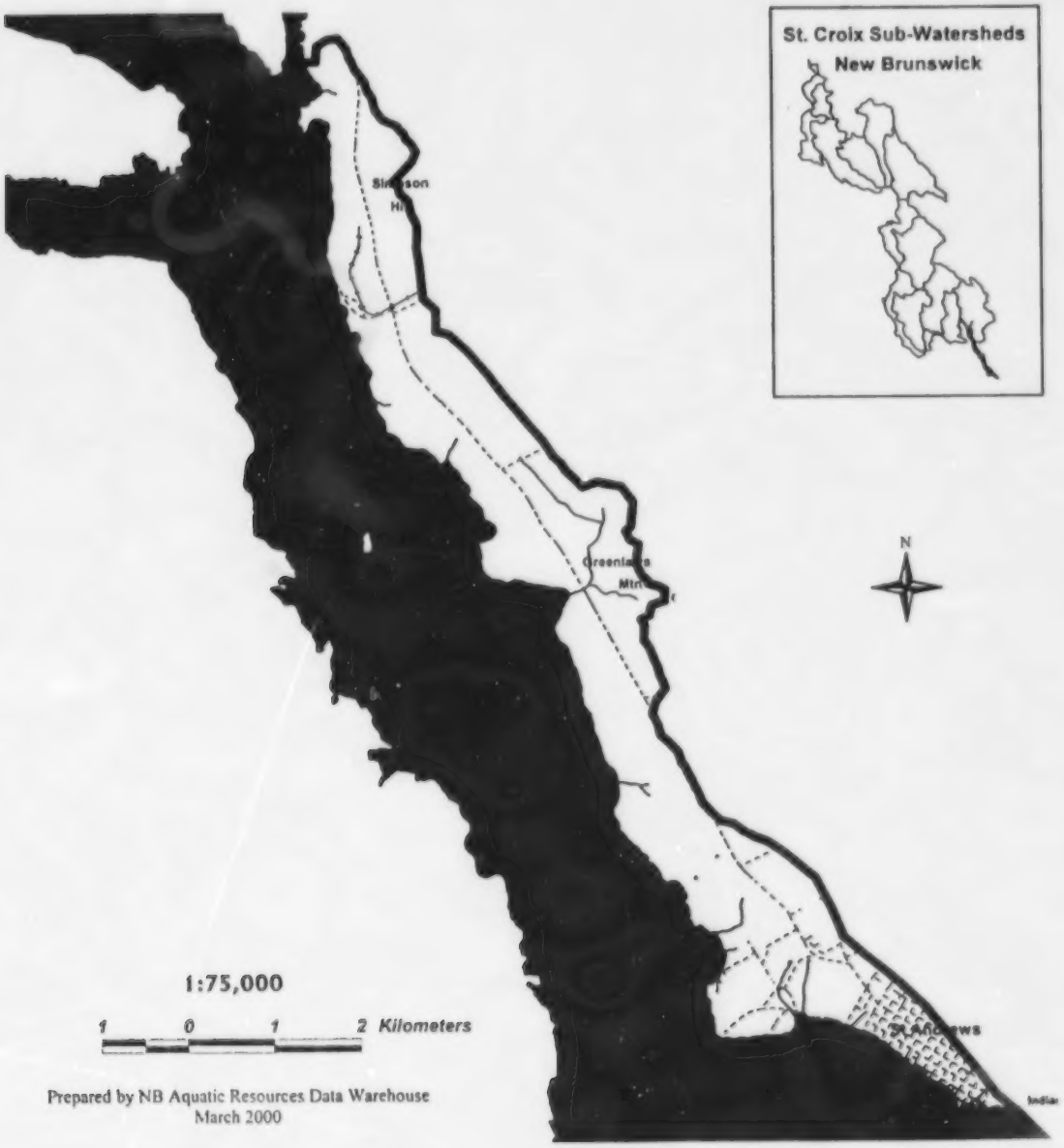
★ Continue and expand Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Complete a more thorough assessment of this sub-watershed to clarify the origins of bacterial sources and consult on long-term goals in order to produce a preliminary classification plan. *By 2001.*

★ Increase BMP use in road maintenance, residential development and agriculture. Test dump sites periodically for potential leaching. *By 2002.*

★ Apply the province's Environmental Impact Assessment process to any mining development. *As warranted.*

Johnsons Cove Composite Sub-Watershed



Total drainage area: 16.2 km^2
Principal settlements: Bayside
Principal waters: Johnsons Brook, Pottery Creek

Description:

This sub-watershed encompasses the short streams that arise from springs along the west side of the St. Andrews peninsula and drain to the St. Croix estuary. A regional port and industrial park complex is sited on the estuary at the upper end of this composite drainage and the Town of St. Andrews is located at the lower end. In between, residential development and old farm fields are scattered along Route 127 which parallels the estuary and crosses the few streams that extend this far inland.

Most of the streams in this sub-watershed flow through woods and farm fields (these largely inactive or hayed) and some are impounded briefly by farm ponds not used by livestock. The largest of these empties into Johnsons Cove, a clam flat.

One watercourse, Pottery Creek, lies within the Town of St. Andrews with both of its year-round branches originating near Bayview Drive. Since the early 1900s the north branch has flowed through the open greenways and water traps of a golf course; the center branch skirts this course and runs for most of its length through woods. Both branches join to flow out into a small salt marsh and beyond to a clam flat.

The St. Andrews headland is included on the provincial list of environmentally significant sites for it seabird habitat and its geology, the latter combining locally-predominant sandstone with volcanic basalt outcrops and calcium carbonate pockets, especially in the Joe's Point to Bar Road area.

Current status:

Principal land uses:

Forest (51%), agriculture (19%), urban (15%), industrial (5%), roads/utilities (4%)

Principal land ownership:

Private small holdings (92%), provincial-industrial (7%)

Principal water quality influences:

Point sources: none [licensed industrial park wastewater treatment plant discharge goes to estuary]

Nonpoint sources: roads, rural residential or business uses, urban uses, golf course, agriculture

Water quality:

Sampled in 1999 at three sites, the stream at Johnsons Cove [JOHN1] and the north and center branches of Pottery Creek [POTT1, POTT2]. The stream at Johnsons Cove showed no unusual characteristics but the branches of Pottery Creek reflected strong local bedrock influences in elevated readings for conductivity, alkalinity, sulphates, selected metals (aluminum, chromium, copper) and other elements (arsenic, calcium, sodium, magnesium).

During the summer of 1999, the north branch of Pottery Creek showed the visible effects of current golf course reconstruction in terms of water quality, quantity and habitat. The golf course operators intend to restore this creek to a near-natural condition and carry out course maintenance activities in a way that will minimize impacts; when this is achieved the creek will meet Class B status and some sections may meet Class A.

Future goals:

Residential and business development will continue to infill open space along Route

127 and the estuary shore, both in the rural areas and in St. Andrews. Use of the port and industrial park will increase.

Recommended preliminary classification:

Class B for the north branch of Pottery Creek, pending further assessments. Class A for all other waters in the Johnsons Cove Composite sub-watershed.

Recommended action:

★ Continue and expand Best Management Practices (BMPs) for forestry operations. *Ongoing.*

★ Increase BMP use in road maintenance, residential development and agriculture. *By 2002.*

★ Naturalize and establish shore buffers along the north branch of Pottery Creek; minimize golf course maintenance impacts on this watercourse; reassess segments for Class status. *By 2003.*

★ Apply BMPs to future urban, industrial and infrastructure developments in this sub-watershed. *As warranted.*

Future Steps

Further Assessments

This short study assembled a 'snapshot in time' of water quality in the St. Croix watershed and, tempering this with historic water data and land use information, produced a classification proposal. While the classification process does not require extensive sampling of all waters, information gaps were identified which deserve attention.

The most notable of these needs are: (1) Additional water tests and impact assessments for the Waweig sub-watershed, to complete classification; (2) macro-invertebrate studies on the river below Woodland for boundary water classification and at other 1999 sites for provincial standards development; and (3) additional water tests to help identify sources and track recommended improvements in the downgraded segments noted in the previous section. Hopefully the N.B. Department of the Environment will support these assessments in 2000.

Action Planning & Implementation

The *Findings & Recommendations* section of this report proposes a wide range of actions by the province, municipalities, the business sector and landowners to maintain high quality waters within New Brunswick, and most particularly the St. Croix watershed, while continuing to use these and surrounding lands for many purposes. Most of these actions are simple, low- or no-cost applications of best management practices however some -- initiating provincial programs or replacing wastewater infrastructure -- will require greater commitments.

An initial outline and timetable for a water quality action plan is included within the previous section of this report, but how to carry this forward?

The basis of the province's water classification program will be a Water Classification Regulation, which has not yet reached final form or been adopted. This formal step is expected in 2000 and will, when completed, lay the legal and operational framework for implementing a water quality action plan for the St. Croix watershed and the province.

Key components of the action plan proposed in this report fall to provincial responsibility and it is hoped that the province can implement these within the next two years.

To the extent that its resources allow, the St. Croix International Waterway Commission will continue to assist municipalities, businesses and landowners to act on the local recommendations in this report. In the near future, priority will be given to collaborating with municipal and business interests to reduce significant impacts on waters that currently fall below Class C standards.

Appreciation

This project was an ambitious undertaking, seeking in a matter of ten months to evaluate and to develop an initial plan for water quality within the New Brunswick portion of the St. Croix watershed.

Its successful completion is due to the extensive cooperation and assistance received from very many people.

In the government sector, particular acknowledgement is due to N.B. Department of the Environment technical and laboratory staff who assisted with the intensive development and assessment needs of the project. Thanks also go to staff of the provincial departments of Natural Resources & Energy, Municipalities and Transportation, and of Environment Canada and the Maine Department of Environmental Protection, who supplied critical information.

In the private sector, willing assistance was received from the area's major forestry companies (St. Anne-Nackawic Pulp Company Ltd., J.D. Irving Ltd., H.J. Crabbe & Sons Ltd.), the mining company Freewest Resources Canada Ltd., and major industries including Georgia-Pacific Corporation and Flakeboard Company Ltd. The staff and councillors of the three municipalities (McAdam, St. Stephen and St. Andrews) were all extremely supportive, as were business interests in these communities and the rural areas.

The N.B. Aquatic Resources Data Warehouse of Doaktown, N.B. did an exceptional job of integrating various GIS map data bases to produce a comprehensive graphic and statistical picture of the St. Croix watershed which was used in assessments and consultations.

Most importantly, many local residents contributed their knowledge, and a number their boats or their time, to the data-gathering and planning aspects of this project. Their willingness and local expertise were invaluable, actually critical, to this project and earn a heartfelt 'thanks' from the small staff that relied upon this help in so many ways.

This project was coordinated by the St. Croix International Waterway Commission, which plans and facilitates delivery of resource and management initiatives along the St. Croix boundary corridor for New Brunswick and Maine.

It was funded by a grant from the New Brunswick Environmental Trust Fund, which is gratefully acknowledged.

Appendices

Appendix 1. St. Croix International Waterway Commission sampling stations, 1998-1999.

STREAM SITES 1999

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-MON2A	Monument Brk above Boundary Ref Mark #6 islands	596245	5085106	83	3
SC-MON1A	Monument Brk @ power line	593913	5078258	83	4
SC-MON1	Monument Brk @ Narrows, nr mouth	594930	5077404	83	2
SC-HAY1	Hay Brk trib @ power line road, North Lk	599880	5079419	83	1
SC-NMILL	Mill Brk @ Rte 122, North Lk	597738	5074365	83	1
SC-EGTR1	Trout Brk @ Forest City Rd, E. Grand Lk	595537	5072557	83	2
SC-FC1	Forest City Str above hwy bridge	599062	5057330	83	6
SC-MUD1	Mud Lake Str @ campsite	598989	5060222	83	1
SC-SMED	Meadow Brk, trib Pirate Brk, @ Company Rd	597921	5068317	83	1
SC-PIR1	Pirate Brk - lower reach, Spednic Lk	598010	5067270	83	1
SC-MUSQ1	Musquash Str nr mouth, Spednic Lk	610010	5056475	83	1
SC-BOLT1	Bolton Str nr mouth, Spednic Lk	610398	5061730	83	1
SC-EBRK1	East Brk nr mouth, Spednic Lk	616300	5057925	83	1
SC-PAL1	Palfrey Str @ Company Rd	616913	5061636	83	5
SC-DEAD1	Dead Brk @ Rte 630	620772	5056962	83	1
SC-THIRD1	Third Lk outfall below dam	624364	5054230	83	2
SC-WBEV1	White Beaver Brk @ RR line	630907	5053462	83	1
SC-MCAD1	McAdam Brk @ RR line	631120	5054205	83	1
SC-DIGY1	Diggity Str @ Rte 630 bridge	622717	5052682	83	6
SC-RVB	St. Croix R betw Vanceboro dam & bridge	622683	5047345	83	6
SC-RWING	St. Croix R @ Wingdam Is	622507	5044170	83	6
SC-RBEAC	St. Croix R @ Upr Beaconsfield campsite	617900	5038255	83	1
SC-CAN2	Canoose R @ picnic site	627260	5025707	83	6
SC-CAN1	Canoose R @ mouth	623725	5025575	83	1
SC-KING2	King Brk below DU dam	625080	5021854	83	1
SC-RGLEAS	St. Croix R @ Gleason Pt	622725	5022061	83	5
SC-RWOOD	St. Croix R 750m below Woodland dam	626175	5001528	83	1
SC-RGRAS	St. Croix R @ Grass Is	627491	5000879	83	2
SC-RBUTL	St. Croix R @ Butler Is	629231	4998962	83	2
SC-RUPM	St. Croix R @ Upper Mills	632143	4999724	83	6
SC-MOH1	Mohannes Str @ Mohannes Rd	630568	5002087	83	6
SC-MOH2	Mohannes Str @ Burnt Hill Rd	629760	5003425	83	1
SC-MOH3	Mohannes Str @ Rte 725	627710	5005391	83	1
SC-DOOD2	Doodle Brk @ Pleasant St	633401	5003584	83	1
SC-RMTB	St. Croix R @ Milltown bridge	633815	5003224	83	6
SC-TAN2	Tan House Brk betw Milltown Blvd & WTP	634140	5004976	83	2
SC-TAN1	Tan House Brk below WTP	634149	5004819	83	2
SC-DEN1	Dennis Str above Axe Factory	636750	5005877	83	6
SC-DEN2	Dennis Str @ Old Hwy 1	636465	5007674	83	2
SC-DEN5	Dennis Str @ Rte 750 above Moore Mills Lk	635506	5016948	83	3
SC-BILL1	Billy Weston Brk nr mouth @ RR tracks	636004	5007274	83	4
SC-BILL1A	Billy Weston Brk behind Mall	635371	5006993	83	2
SC-BILL2	Billy Weston Brk @ St. Stephen Drive	633815	5006936	83	1
SC-MEAD1	Meadow Brk @ Ledge Rd, Oak Bay	641077	5005234	83	2
SC-MEAD4	Meadow Brk @ Old Hwy 1	638376	5007739	83	1
SC-HAT2	Hatchery Str @ Ledge Rd, Oak Bay	641488	5008108	83	1
SC-BENS1	Benson's Corner Str @ Ledge Rd, Oak Bay	641732	5008766	83	2
SC-PARK1	Park Str @ campground rd, Oak Bay	642047	5009552	83	1
SC-GALL1	Gallop Str above Rte 755 bridge	642037	5011003	83	6
SC-COTT1	Cottrell Brk @ Old Hwy 1	644588	5008585	83	1
SC-WAW1	Waweig R @ camp above head-of-tide	646185	5010017	83	6
SC-POUT2	Pout Brk @ Rte 760 (Roix Rd)	644906	5011003	83	4
SC-WAW3	Waweig R @ Rte 760 (Roix Rd)	646543	5012524	83	3

STREAM SITES 1999 (cont.)

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-GOLD1	Goldsmith's Str @ Rte 127	646180	5007525	83	2
SC-GOLD2	Goldsmith's Str @ Hwy 1	647649	5007390	83	1
SC- GRLAW1	Greenlaw Brk @ Rte 127	646220	5004700	83	1
SC-JOHN1	Johnson's Str nr mouth	649183	4998410	83	1
SC-POT1	Pottery Crk left branch, above Joes Pt. Rd.	651950	4993511	83	4
SC-POT2	Pottery Crk center branch, above Joes Pt. Rd	651935	4993507	83	2

LAKE SITES 1999 (UTMs approximated, not field recorded)

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-GFF 2	Gr Falls Flowage Stn 2 - deep hole nr penstock	618650	5014050	27	12
SC-SIXTH 1	Sixth Lake deep hole	620095	5064548	27	4
SC-FIFTH 1	Fifth Lake deep hole	622792	5063792	27	12
SC-BLTN1	Bolton Lake deep hole	610365	5061825	27	7
SC-WD 2	Woodland Flowage Stn2- upper basin deep hole	623350	5005398	27	12
SC-WD 1	Woodland Flowage Stn1- lower basin deep hole	625650	5002900	27	12
SC-MODS1	Modsley Lake deep hole	629265	5053642	27	4

LAKE SITES 1998 (UTMS approximated, not field recorded)

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-CNOS1	Canoose Flowage deep hole	630250	5030200	27	7
SC-EGR1	E. Grand Lk Stn 1 - deep hole nr Greenland Pt	598000	5058500	27	12
SC-EGR4	E. Grand Lk Stn 4 - deep hole nr the Tongue	598000	5057000	27	12
SC-EGR6	E. Grand Lk Stn 6 - deep hole nr Blueberry Pt	592700	5071500	27	12
SC-NTH1	North Lk Stn 1 - deep hole west end	596450	5074900	27	11
SC-NTH2	North Lk Stn 2 - deep hole east end	598450	5076100	27	11
SC-SKIF1	Skiff Lk Stn 1 - deep hole nr isld N of Mill Is	614800	5075000	27	13
SC-SPED1	Spednic Lk Stn 1 - deep hole nr Forest City Lndg	601100	5057400	27	12
SC-SPED5	Spednic Lk Stn 5 - deep hole nr islds off Dark Cove	601550	5049000	27	12
SC-SPED6	Spednic Lk Stn 6 - deep hole nr O'Malleys Is	612080	5050700	27	12
SC-SPED7	Spednic Lk Stn 7 - deep hole Palfrey Lk	619000	5055500	27	12
SC-WAUK1	Wauklehegan Lk Stn 1 - deep hole west end	612670	5051600	27	13
SC-WAUK2	Wauklehegan Lk Stn 2 - deep hole east end	628900	5050700	27	12

ESTUARY SITES 1999

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-EWAW1	Waweig R. @ mouth	645717	5004355	27	1
SC-EWAW2	Waweig R. @ top of narrows below Ricketts Is.	645860	5005950	27	1
SC-EWAW3	Waweig R. @ top Ricketts Is.	645679	5007063	27	1
SC-EWAW4	Waweig R. @ old Hwy #1 bridge	645425	5007625	27	1
SC-ESCR1	Lwr St. Croix R. betw Todds Pt/Devils Hd (EC D-2)	644185	5002596	27	1
SC-ESCR2	Lwr St. Croix R. betw Spruce Pt/Stone House	641676	5002895	27	1
SC-ESCR4	Lwr St. Croix R. @ Knights Pt.	638735	5003014	27	1
SC-ESCR6	Lwr St. Croix R. below Crocker Is	637079	5004587	27	1
SC-ESCR8	Lwr St. Croix R. @ St. Stephen wharf	635415	5005670	83	1
SC-ESCR9	Lwr St. Croix R. @ Ferry Pt. Bridge	634900	5005300	27	2

EXPLORATORY SITES FOR BILLY WESTON BROOK (E. COLI) - 1999

SCIWC Site #	Short description	UTM-E	UTM-N	NAD	# samples
SC-BILL1B	Billy Weston Brk @ top of mall entrance culverts	635570	5006855	83	1
SC-BILL1C	Billy Weston Brk @ nr highway sign @ traffic circle	635688	5007050	83	1
SC-DEN2A	Dennis Str 10m below mouth Billy Weston Brk	636296	5007072	83	1
SC-DEN2B	Dennis Str @ old Shoreline RR crossing	636112	5006850	83	1

Appendix 2. Primary point source discharges, St. Croix watershed. Listed in descending order from the system's source, including New Brunswick and Maine discharges.

Location	Owner	Facility/Use	Discharging to	Licence or Permit	Daily discharge design:average (m3/day)	Avg. tested coliform loading (CFU/100ml)	Other primary load components of interest
McAdam, NB	Village of McAdam	Municipal wastewater treatment facility: sanitary, industrial & storm	Wauklehegan L.	NB: S-M2-2	1318:1099	not measured	BOD, TSS, TKN, TP, Cl, temp
Baileyville, ME	Fulghum Fibers	Stormwater outfall	St. Croix R.		not measured	N/A	none
Baileyville, ME	Georgia-Pacific Corp.	Cooling water, boiler house and stormwater outfalls	St. Croix R.	US: ME00-22063 ME: W000508	cooling 56850:53060	N/A	BOD, TSS, temp
					boiler/storm 454:245	89 (fecal coliform)	
Baileyville, ME	Georgia-Pacific Corp.	Industrial wastewater treatment facility: sanitary, industrial, landfill leachate. Second outfall for cooling water & stormwater discharge	St. Croix R.	US: ME00-01872 ME: W002766	151600: 87170	2 (fecal)	BOD, COD, TSS, temp
Baileyville, ME	Town of Baileyville	Municipal wastewater treatment facility: sanitary, industrial & storm	Wapsaconhagan Brk./St. Croix R.	ME: ME01-01320	1137:1167	57 (e. coli)	BOD, TSS, TKN, TP, temp
Baring, ME	Irving Oil Corp.	Gas station/restaurant wastewater treatment facility: sanitary	St. Croix R.	ME: 006607	___:75	not available	BOD, TSS, TKN, TP, Cl, temp
St. Stephen, NB	Flakeboard Co.	Cooling water	Tan House Brk.	NB: I-1493	___:1500	N/A	temp
St. Stephen, NB	Town of St. Stephen (at Milltown)	Municipal wastewater treatment facility: sanitary, industrial & storm	Tan House Brk.	NB: S-S20-1-2	954:1285	not measured	BOD, TSS, TKN, TP, temp
St. Stephen, NB	Town of St. Stephen (at St. Stephen)	Municipal wastewater treatment facility: sanitary, industrial & storm	St. Croix R.	NB: S-S20-2-2	2045:___	48,600 (fecal)	BOD, TSS, TKN, TP, Cl, temp
St. Stephen, NB	Town of St. Stephen	Stormwater and combined sanitary/storm water lines	St. Croix R.	N/A	not measured	not measured	bacteria, TSS, road chemicals

Location	Owner	Facility/Use	Discharging to	Licence or Permit	Daily discharge design:average (m3/day)	Avg. coliform loading (CFU/100ml)	Other primary load components of interest
Calais, ME	City of Calais	storm water lines	St. Croix R.	N/A	not measured	N/A	TSS, road chemicals
Calais, ME	City of Calais	Municipal wastewater treatment facility: sanitary, industrial & storm	St. Croix R.	ME: 002751-46-DR	5670:1890	0 (e.coli)	BOD, TSS
Calais, ME	Washington Co. Technical College, Calais School Board	Institutional wastewater treatment facility: sanitary	St. Croix R.	ME: 001339	56:39	5.6 (e.coli)	BOD, TSS, Cl
Dufferin, NB	Atlantic Homes Ltd.	Trailer park wastewater treatment facility: sanitary	Meadow Brk	NB: *	not measured	74,400 (fecal coliform)	BOD, TKN, TP, TSS, DO, temp
Oak Bay, NB	Oak Bay Hatchery	Hatchery wastewater treatment facility	Unnamed stream to Oak Bay	NB: I-2406, I-2416	5246:1636	N/A	TSS, TKN, TP
Oak Bay, NB	Province of New Brunswick	Campground wastewater treatment facility: sanitary	Unnamed stream to Oak Bay	NB: *	not measured	69,700 (fecal coliform)	BOD, TSS, TKN, TP, Cl, DO, temp
Waweig, NB	River Bend Hatchery	Hatchery wastewater treatment facility	Waweig R.	NB: I-2350	2182:____	N/A	TP
Bayside, NB	Province of New Brunswick	Industrial wastewater treatment facility, septage disposal: sanitary & industrial	St. Croix estuary near Waweig R	NB: *	____: 453	243,960 (fecal coliform)	BOD, TSS, TKN, TP, temp
St. Andrews, NB	Huntsman Marine Science Centre	Institutional wastewater treatment facility: sanitary	St. Croix estuary at Brandy Cove	NB: *	____: 23	409,000 (fecal coliform)	BOD, TSS, TKN, TP, DO, temp
St. Andrews, NB	Fisheries & Oceans Canada	Institutional wastewater treatment facility: sanitary	St. Croix estuary near Brandy Cove	N/A	not available	0 (fecal coliform)	BOD, TSS, Cl
St. Andrews, NB	Town of St. Andrews	storm water lines	St. Andrews harbor	N/A	not measured	N/A	TSS, road chemicals

NB: *- indicates a permit to construct was issued for this facility but an operating permit has not yet been established
Parameters: BOD = biological oxygen demand, COD = chemical oxygen demand, Cl = chlorine, DO = dissolved oxygen, NO_x = nitrate/nitrite, temp = temperature, TKN = total Kjeldahl nitrogen, TP = total phosphorus, TSS = total suspended solids, temp = temperature
Unit conversions: 1 m3 = 264.16 US gal 1 US gal = 0.00379 m3

Appendix 3. Primary non-point source pollution influences, St. Croix watershed.

Category	Source	Increases these effects								BMPs available?
		bacteria, viruses	excess nutrients	petroleum hydrocarbons	silt	salts	metals	other	water runoff	
Waste disposal	Inadequate septic systems	✔	✔							yes
	Farm & domestic animals, manure spreading	✔	✔							yes
	Former dumps/landfills			✔			✔	✔		yes
	Industrial disposal sites	✔	✔					✔		yes
Ground disturbance	Road construction			✔	✔			✔	✔	yes
	Land development			✔	✔				✔	yes
	Ploughed land				✔				✔	yes
	Logging			✔	✔				✔	yes
	Mining, gravel pits			✔	✔			✔	✔	yes
	Recreational vehicles			✔	✔				✔	yes
Paved surfaces	Urban stormwater runoff	✔		✔	✔	✔	✔		✔	yes
	Highway and rural runoff			✔	✔	✔	✔	✔	✔	yes
	Snow dumping			✔	✔	✔	✔	✔		yes
Residential	roofs, patios, lawns, use of household chemicals		✔					✔	✔	yes
Airborne substances	distant industrial/energy plants, vehicle exhaust			✔			✔	✔		yes

Category	Source	Increases these effects							BMPs available?
		bacteria, viruses	excess nutrients	petroleum hydrocarbons	silt	salts	metals	other	water runoff	
Ground treatments - large scale	farm fields, blueberry grounds, utility corridors, golf courses		✔					✔		yes
Petroleum, road salt & chemical storage or transportation	spills, improper storage or disposal			✔		✔		✔		yes
Boat traffic	Motorized recreational and commercial craft	✔		✔				✔		yes

Other includes release of bedrock elements (including heavy metals), various hazardous substances, pesticides, herbicides, undegradable trash

Appendix 4. Summary of parameters included in New Brunswick Water Classification water quality assessments. Unless otherwise noted, the Canada Guidelines cited are the Canadian Environmental Quality Guidelines for the Protection of Aquatic Life.

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Alkalinity, Grans (Alk-G)	Indicates water's ability to neutralize acid. Stated as an equivalent value of calcium carbonate in mg/l.			30-500 mg/l is generally acceptable. 2-10 mg/l shows sensitivity to acidification.
Aluminum (Al)	The most abundant metal in the earth's crust. An essential trace element for life processes, toxic to fish at higher levels.	≤ 5 μg/l at pH≤ 6.5 ≤ 100 μg/l at pH>6.5		
Ammonia (NH_3)	A nitrogen/hydrogen form generated by plant and animal excretions; manufactured in inorganic form for use in fertilizers and cleaners. It affects oxygen transport in blood and is toxic to fish at low levels.	Varies with temperature and pH, generally ≤1370 -2200 μg/l		Generally <100 μg/l in surface waters
Antimony (Sb)	A brittle, inert metal often found with lead, silve and copper deposits. Used in compounds ranging from metal alloys to medicines.			
Arsenic (As)	A semi-metallic element found naturally in the common mineral arsenopyrite. A byproduct of smelting; used in industrial processses. Accumulates in the body. Some forms are quite toxic.	≤ 50 μg/l		Typically 0-10 μg/l in surface waters
Bacteria, *E. coli* (EC)	One of the fecal coliform bacteria most commonly used as an indicator of sewage pollution. Listed as the most probable number (MPN) in 100ml water. N.B. standard is a geometric mean of a minimum of 5 samples in a 30 day period.	For swimming waters, a mean of <200 MPN for 5 samples in a 3 day period and <400 MPN for any one sample; no guideline is set for aquatic life	Class AP: no *e.coli*. Class 0, AL & A: as naturally occurs. Class B: <200. Class C: <400. Class B & C (tidal shellfish areas): < 14.	

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Cadmium (Cd)	A soft metal found in association with metallic ores. Used in batteries, electroplating and solder. Toxic above trace levels; accumulates in the body.	≤0.017μg/l		Typically 0.1-10μg/l in natural surface waters
Calcium, dissolved (Ca-D)	An alkaline-earth metal vital for bone development and muscle function. It and magnesium primarily determine water hardness.			< 15 mg/l is common in this region's surface waters. Can be up to 100 mg/l, even higher in tidal waters.
Carbon, total organic (TOC)	Organic carbon is required for most biological processes. This indicates the amount of organic (plant and animal) matter in the water: it will deplete waterborne oxygen as it decays.			General range is 1-30 mg/l but < 10 mg/l is typical in higher quality waters
Chloride (C_l)	Major inorganic ion; with sodium forms common salt. Essential for life in trace amounts. As chlorine or chloride, used commonly in road salting, water and sewage disinfection and bleaches.			Generally <10mg/l in freshwaters
Chlorophyll A (ChlA)	Green pigment found in plants; can be used to estimate the amount of plant life in the water.			Generally < 4 mg/l in unproductive, nutrient-poor waters; 10-100 ug/l in very productive or enriched lakes
Chromium (Cr)	A metal used extensively to harden and plate other metals. Used by the body in its trivalent form to metabolize fats and carbohydrates; toxic in other forms	≤8.9 μg/l for trivalent chromium, ≤1 μg/l for other forms		Generally ranges 0-17μg/l in surface waters

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Clarity (Secchi)	An index of how far light penetrates into the water; measured as the maximum depth at which a 25cm diameter 'secchi' disk with black and white quadrants can be seen in the water.	For recreation, >1.2m viewing depth when measured without a viewing scope; no guideline for aquatic life		Decrease in secchi reading may indicate increased suspended matter; this often occurs at lake turnover in spring and fall and during algae blooms
Color, Apparent (Clra)	Color given to water by dissolved matter, suspended particles and light, measured on a color band scale.	Mean value not significantly less than that tobe expected for those waters on a seasonal basis		Varies significantly. Decaying vegetation, tree bark and other organic matter color water naturally
Conductivity (Cond)	Ability to carry an electrical current, helpful in determining the amount of dissolved matter in water.			Normal range 10-50 usie/cm in NB waters . Groundwater often higher than surface water.
Copper (Cu)	A metal essential, in trace amounts, to blood cell formation, nerves and the immune system; toxic above trace levels. Used in manufacturing metals and in fungicides and pesticides.	From ≤2 μg/l at a water hardness of 0-120mg/l to ≤4 μg/l at a hardness of > 180mg/l		Generally less than 50μg/l in surface waters
Fluoride (F)	A compound of the gas fluorine and oxgen. In trace amounts it aids bone and tooth formation; toxic in higher amounts. Often added to drinking water to prevent dental cavities.			Usually found in surface waters in a range of 0-2 mg/l
Hardness (Hard)	A measure of the calcium, magnesium and other divalent ions in water, expressed in calcium carbonate equivalent in mg/l. Increased hardness can decrease metal toxicities and acidity but increase mineral deposits.			Varies from 0-30 mg/l in very soft water to >180 mg/l in very hard water

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Iron (Fe)	A metal, the fourth most common element on earth. Essential in forming hemoglobin (the oxygen-carrying blood pigment), also present in enzmes and proteins. Interferes with insect and fish reproduction and respiration.	≤300 μg/l		Usually less than 500 μg/l in surface waters
Lead (Pb)	A metal; its resistance to corrosion led to its extensive use in plumbing, paint and batteries until it was found to have a cumulative toxic effect on humans.	≤ 1μg/l - ≤7μg/l, depending on water hardness		Typically 0-40 μg/l in natural surface waters
Macro-invertebrates, benthic	Bottom-dwelling aquatic insects and other invertebrate animals large enough to be visible. The types and numbers of these are a good indicator of water characteristics over time.		As naturally occur in New Brunswick waters	Profiles are being developed which relate the macro-invertebrates found to various water quality types.
Magnesium (Mg)	A metal involved in bone growth and nerve and muscle function. Forms the core of the plant photosynthesis compound, chlorophyll. With calcium, primarily determines water hardness.			Normal range is 1-100 mg/l in surface waters
Manganese (Mn)	A metal involved in bone growth and energy production. May be essential to vitamin B1 utilization.			Usually >0.2mg/l in surface waters
Nickel (Ni)	A metal used extensively in alloys, it occurs naturally in trace amounts in foods and may be needed for human health. However it accumulates in the food chains of aquatic species, with some toxic effects.	Ranges from 25 μg/l at a water hardness of 1-60 mg/l to 150 μg/l at a hardness of >180 mg/l		Generally 15-20 μg/l in surface waters

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Nitrite (NO_2)	A transitory form of oxidized nitrogen produced by bacteria in nature, also found in industrial and sewage effluents. Toxic to humans and others above low levels.	≤60 μg/l		Usually < 1 μg/l in surface waters
Nitrate (NO_3)	The most common, stable form of nitrogen in surface waters. A product of natural nitrogen-fixing cycles and rock leaching, also found in sewage, industrial discharges and fertilizer runoff.			0.1-5 mg/l common in surface water; may be 100 mg/l or more in water affected by groundwater, sewage or fertilizers.
Nitrate + Nitrite (NO_x)	The combined inorganic forms of oxidized nitrogen. A major nutrient source for aquatic plants but can be toxic to fish at higher levels.			0.1-5 mg/l common in surface water; higher in water influenced by groundwater, sewage or fertilizer runoff.
Nitrogen, total Kjeldahl (TKN)	Nitrogen is the earth's most common gas and a key building block of many compounds. It is measured here as the sum of the organic forms of nitrogen and ammonia.			Commonly 0.1-0.5 mg/l in surface waters
Oxygen, dissolved (DO)	Oxygen is one of earth's most versatile and abundant elements. Dissolved in water, it is used for respiration by most aquatic life. Dissolved oxygen levels are affected by temperature and aeration: cold or standing water generally have lower levels. Often measured in parts per million (ppm): 1ppm = 1 mg/l	≥5.5-6mg/l for warm-water species; 6.5-9 mg/l for coldwater species: higher values for early life stages	*for cold-water species*: ≥9.5ppm (early stages), ≥6.5ppm (other stages) *for warm-water species:* ≥6.0ppm (early stages), ≥5.0ppm (other stages), *in estuarine waters:* ≥80% saturation	Generally 4-10ppm in surface waters
pH (pH)	A measure of acidity/alkalinity based upon hydrogen ion concentration. A value of 7 is neutral; lower is acidic and higher is alkaline	6.5 - 9.0 for aquatic life, 6.5-8.5 for contact recreation		Natural freshwaters range pH4-9. A pHof 6.0-7.5 is most common in this region

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Phosphorus, total (TP-L)	A non-metallic element common in in-organic and organic forms. An essential plant nutrient and key biological building block; stimulates plant growth. Used commonly in fertilizers, cleaners and water conditioners.			Should be ≤ 25 μg/l in lakes and reservoirs to prevent excess algae growth, generally ≤ 10 μg/l in rivers
Potassium (K)	An alkali metal essential for function of nerves, muscles and vital organs.			Generally < 10mg/l, rarely as high as 20mg/l
Sodium (Na)	A major alkali metal and important inorganic ion. With other elements, it forms salts widely used in households, industry and road maintenance. Helps regulate body fluid balance and blood pressure.			1 mg/l -100,000 mg/l is common in surface waters
Solids, total suspended (TSS) or (SS)	Measure of the solid particles, organic and inorganic, that can be filtered from the water.	For clear waters ≤ 25mg/l above background for short term, ≤5mg/l for longterm. ≤10% change if background is >100mg/l		
Sulphate (SO_4)	An oxidized form of sulfur; comes naturally from rock leaching and biological processes. Used in some industrial processes.			5-5000 mg/l is found in surface waters
Temperature (Temp)	A measure of heat energy. Affects water's ability to hold dissolved oxygen and the respiration rate of most aquatic organisms	Varies, to keep changes within the tolerance range of the aquatic species present		Summer range of 18-25°C is common for lake surface waters; annual range of 0-25 °C is typical for all waters

PARAMETER (table abbreviation)	DESCRIPTION	CANADA GUIDELINE	PROPOSED NB STANDARD	WATER-RELATED BACKGROUND
Turbidity (Turb)	A measure of water clarity resulting from particles in the water (silt, algae, etc). Measured in nephelometric turbidity units (NTU).	For clear waters ≤ 8 NTU above background for short term, ≤ 2NTU for longer term. For turbid waters ≤10% change.		Can range 0.1-1000 NTU in natural waters, but is typically 0.1-5 NTU
Zinc (Zn)	A natural metal used in many alloys (ex: brass, bronze, galvanized steel). Essential to immune system and cell development in trace amounts; toxic to aquatic life at higher levels.	<30 µg/l		Typically <50 µg/l in natural surface waters.

Units of measure:
mg/l: milligrams per liter. µg/l: micrograms per liter (1000 micrograms = 1 milligram). ppm: parts per million.

Primary references:
Canadian Council of Ministers of the Environment. 1999. Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment, Winnipeg, Man.
R.N. McNeely, V.P. Neimanis and L. Dwyer. 1979. Water Quality Sourcebook: A Guide to Water Quality Parameters. Environment Canada, Ottawa, Ont.

APPENDIX 5a. 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	AL ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	CD ug/l as Cd	Cl mg/l as Cl-
SC-MON2	Monument Brk above boundary ref mark #6 islands	99/06/28	2032	199905181	94/00493	0.015	27.00	1.14	9.17	0	1.99
		99/07/19	1755	--	--						
		99/08/23	1325	199908985	94/00620	0.020	30.20	1.1	13.00	0	2.36
SC-MON1A	Monument Brk @ power line	99/07/19	1744	199906674	94/00551	0.014	32.50	1.28	12.80	0	2.26
		99/08/23	1335	199908986	99/00607	0.025	28.40	1.13	12.80	0	1.69
		99/09/27	1150	199911158	94/00664	0.101	15.90	1.05	9.66	0	2.19
		99/10/17	1345	199912818	94/00665	0.094	14.40	0	8.64	0	2.13
SC-MON1	Monument Brk @ Narrows, nr mouth	99/08/23	1735	199908987	99/00609	0.069	25.30	1.1	11.80	0	0.50
		99/09/27	1230	199911155	94/00663	0.088	12.40	0	7.80	0	0.93
		99/10/17	1220	199912817	94/00667	0.096	10.80	0	6.95	0	1.25
SC-HAY1	Hay Brk trib @ power line road, North Lk	99/07/11	1719	199905087	94/00513	0.074	12.90	0	4.75	0	0.34
SC-NMILL1	Mill Brk @ Rte 122, North Lk	99/07/11	1705	199905993	94/00519	0.278	7.23	0	3.72	0	0.38
SC-EGTR1	Trout Brk @ Forest City Rd, E. Grand Lk	99/07/11	1740	199905985	94/00510	0.127	24.60	0	10.30	0	5.35
		99/08/23	1855	199908988	94/00610	0.047	27.40	0	11.30	0	4.58
SC-FC1	Forest City Str above hwy bridge	99/06/25	1442	199905172	94/00487	0.009	9.28	0	3.89	0	1.67
		99/06/28	2114		94/00495						
		99/07/19	1602	199906673	94/00550	0.009	10.30	0	4.29	0	1.53
		99/08/05	1605	199907771	94/01373	0.008	10.60	0	4.70	0	1.53
		99/08/23	1930	199908989	94/00611	0.007	10.40	0	4.21	0	1.32
		99/09/09	2000	199909940	94/01530	0.007	9.09	0	4.17	0	1.86
		99/10/17	1425	199912819	94/00669	0.008	9.18	0	4.43	0	1.84
SC-MUD1	Mud Lake Str @ campsite	99/06/25	1415	199905171	94/00486	0.010	8.11	0	3.77	0	1.72
SC-SMED	Meadow Brk, trib Pirate Brk, @ Company Rd	99/06/25	1346	199905170	94/00485	0.095	13.10	0	6.14	0	0.68
		99/06/28	2133	199905184	94/00496						
SC-PIR1	Pirate Brk - lower reach, Spednic Lk	99/09/27	1455	199911156	94/00666	0.247	6.68	0	5.06	0	1.18
SC-MUSO1	Musquash Str @ wood road, Spednic Lk	99/08/29	1543	199909312	99/00608	0.016	18.70	1.04	6.92	0	0.95
SC-BOLT1	Bolton Str nr mouth, Spednic Lk	99/08/17	1605	199908558	94/00590	0.056	6.76	0	3.39	0	0.63
SC-EBRK1	East Brk nr mouth, Spednic Lk	99/08/17	1520	199908556	94/00522	0.030	4.74	0	2.23	0	0.69

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	AL ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	CD ug/l as Cd	Cl mg/l as Cl-
SC-PAL1	Palfrey Str @ Company Rd	99/06/28	2200	199905182	94/00494	0.038	10.40	0	4.07	0	1.23
		99/07/19	1901	199906675	94/00549	0.031	11.10	0	4.24	0	0.98
		99/08/23	2025	199908990	94/00612	0.076	9.89	0	4.66	0	0.71
		99/09/27	1830	199911157	94/00668	0.220	3.74	0	3.80	0	1.40
		99/10/17	1500	199912820	94/01670	0.282	3.55	0	3.59	0	1.38
SC-DEAD1	Dead Brk @ Rte 630	99/06/28	2220	199905185	94/00497	0.064	15.10	0	4.90	0	1.47
		99/07/19	1325	--	--						
SC-THIRD1	Third Lk outfall below dam	99/06/28	2240	199905186	94/00498	0.063	4.62	0	2.09	0	1.07
		99/07/19	1923	199906676	94/00548	0.039	5.76	2.18	2.40	0	0.57
SC-WBEV1	White Beaver Brk @ RR line	99/07/11	2030	199905986	94/00512	0.315	5.28	1.38	3.18	0	5.68
SC-MCAD1	McAdam Brk @ RR line	99/07/11	2000	199905992	94/00520	0.292	4.09	0	3.22	0	0.68
SC-DIGY1	Diggity Str @ Rte 630 bridge	99/06/28	2305	199905187	94/00499	0.055	3.89	0	2.08	0	2.34
		99/07/19	1940	199906677	94/00547	0.042	4.51	0	2.32	0	2.11
		99/08/05	1750	199907772	94/01374	0.042	4.31	0	2.48	0	2.17
		99/08/23	2045	199908991	94/00613	0.030	5.44	0	2.50	0	1.92
		99/09/08	1920	199909899	94/01529	0.035	4.36	0	2.42	0	2.87
		99/10/17	1520	199912821	94/01574	0.051	5.06	0	2.44	0	2.32
SC-RVB	St. Croix R betw Vanceboro dam & bridge	99/06/23	1205	199904898	94/00431	0.035	5.26		3.04	0	1.32
		99/07/18	2055	199906588	94/00553	0.022	4.89	0	2.86	0	1.43
		99/08/05	1925	199907774	94/01376	0.021	7.11	0	3.39	0	1.35
		99/08/22	1825	199908893	94/00606	0.014	7.33	0	3.27	0	1.31
		99/09/08	1755	199909898	94/01528	0.015	7.88	0	3.30	0	1.78
		99/10/17	1535	199912822	94/01563	0.030	5.76	0	3.53	0	1.82
SC-RWING	St. Croix R @ Wingdam Is	99/06/23	1300	199904911	94/00449	0.033	5.39	0	2.92	0	1.41
		99/07/18	2027	199906587	94/00552	0.022	5.72	0	2.87	0	1.34
		99/08/05	1820	199907773	94/01375	0.022	7.05	0	3.36	0	1.36
		99/08/22	1745	199908892	94/00605	0.016	7.51	0	3.42	0	1.25
		99/09/08	1640	199909897	94/01527	0.014	6.97	0	3.34	0	1.64
		99/10/17	1605	199912823	94/01564	0.034	6.77	0	3.53	0	1.76
SC-RBEAC	St. Croix R @ Upr Beaconsfield campsite	99/10/17	1705	199912824	94/01567	0.053	7.03	0	3.75	0	1.78
SC-CAN2	Canoose R @ picnic site	99/06/23	1030	199904896	94/00429	0.056	10.90	0	5.78	0	3.02
		99/07/18	1750	199906596	94/00546	0.048	11.10	1.20	5.26	0	2.68
		99/08/05	2030	199907775	94/01377	0.058	12.80	1.21	5.60	0	2.93
		99/08/17	2110	199908559	94/00592	0.058	12.30	0	5.05	0	2.31
		99/09/26	1815	199910948	94/01561	0.185	12.50	0	8.64	0	2.62
		99/10/17	1735	199912825	94/01568	0.136	14.10	0	8.37	0	3.16

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Al ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	Cd ug/l as Cd	Cl mg/l as Cl-
SC-CAN1	Canoose R @ mouth	99/08/17	2030	199908557	94/00559	0.054	12.40	1.11	5.47	0	2.31
SC-KING2	King Brk below DU dam	99/10/17	1750	199912826	94/01569	0.107	32.00	0	13.20	0	2.33
SC-RGLEAS	St. Croix R @ Gleason Pt	99/06/23	0950	199904895	94/00428	0.031	7.54	0	3.63	0	1.81
		99/07/18	1720	199906595	94/00545	0.026	6.28	0	3.07	0	1.72
		99/08/22	1550	199908903	94/00603	0.018	7.37	0	3.30	0	1.43
		99/09/26	1729	199910947	94/01560	0.205	6.72	0	6.02	0	2.54
		99/10/18	1715	199912971	94/01570	0.090	3.70	0	3.97	0	2.39
SC-RWOOD	St. Croix R 750m below Woodland dam	99/08/30	1105	199909407	94/00615	0.013	7.40	0	3.15	0	1.45
SC-RGRAS	St. Croix R @ Grass Is	99/07/07	1340	199905814	94/00503	0.038	8.20	0	3.54	0	2.08
		99/08/30	1135	199909408	99/00616	0.014	7.16	0	3.22	0	1.39
SC-RBUTL	St. Croix R @ Butler Is	99/07/07	1430	199905813	94/00504	0.050	12.20	0	4.53	0	6.54
		99/08/30	1220	199909409	94/00617	0.042	16.00	0	5.55	0	8.43
SC-RUPM	St. Croix R @ Upper Mills	99/06/23	0910	199904894	94/00427	0.072	10.70	0	4.41	0	6.87
		99/07/18	1645	199906594	94/00544	0.059	12.50	0	5.15	0	9.53
		99/08/06	1630	199907776	94/01378	0.053	14.40	0	5.92	0	9.49
		99/08/30	1325	199909410	94/00618	0.042	16.90	0	5.93	0	9.52
		99/09/15	1050	199910264	94/01547	0.064	9.74	0	4.88	0	6.10
		99/10/18	1635	199912969	94/01587	0.097	8.30	0	3.78	0	4.07
SC-MOH1	Mohannes Str @ Mohannes Rd	99/06/23	0850	199904893	94/00426	0.150	10.70	2.43	5.10	0	2.52
		99/07/18	1630	199906593	94/00543	0.068	12.80	2.55	5.00	0	2.50
		99/08/06	1705	199907777	94/01379	0.041	17.60	1.94	6.45	0	2.63
		99/08/22	1500	199908901	94/00601	0.032	17.20	1.78	5.75	0	2.56
		99/09/26	1645	199910945	94/00483	0.375	5.96	1.67	6.41	0	3.53
		99/10/18	1645	199912970	94/01571	0.334	7.58	1.45	5.21	0	3.25
SC-MOH2	Mohannes Str @ Burnt Hill Rd	99/08/22	1520	199908902	94/00602	0.040	15.60	2.26	5.70	0	2.65
SC-MOH3	Mohannes Str @ Rte 725	99/09/26	1700	199910944	94/00482	0.406	6.37	1.87	6.65	0	3.36
SC-DOOD2	Doodle Brk @ Pleasant St	99/07/07	1700	199905815	94/00502	0.099	43.80	1.78	14.00	0	6.43
SC-RMTB	St. Croix R @ Milltown bridge	99/06/23	830	199904892	94/00425	0.080	15.40	0	5.71	0	10.50
		99/07/18	1620	199906592	94/00554	0.059	17.20	0	5.59	0	11.30
		99/08/06	1730	199907778	94/01380	0.042	17.60	0	6.29	0	9.95
		99/08/22	1445	199908900	94/00600	0.035	11.20	0	4.38	0	5.58
		99/09/08	1010	199909896	94/01526	0.036	19.20	0	7.46	0	20.80
		99/10/18	1558	199912968	94/01572	0.154	7.29	0	5.31	0	5.37

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	AL ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	CD ug/l as Cd	Cl mg/l as Cl-
SC-TAN1	Tan House Brk @ mouth	99/07/07	1723	199905817	94/00506						
		99/10/18	1545	199912972	94/01581	0.769	25.00	1.54	11.90	0	18.80
SC-TAN2	Tan House Brk betw Milltown Blvd & WTP	99/07/07	1710	199905816	94/00505						
		99/10/18	1535	199912967	94/00677	0.510	25.90	1.29	11.30	0	17.40
SC-DEN1	Dennis Str above Axe Factory	99/06/23	0805	199904891	94/00424	0.075	12.30	1.53	5.56	0	12.80
		99/07/18	1555	199906591	94/00521	0.046	20.60	1.77	7.49	0	21.80
		99/08/06	1850	199907779	94/01381	0.050	22.40	1.7	8.42	0	16.50
		99/08/22	1430	199908899	94/00599	0.041	18.40	1.66	6.80	0	12.40
		99/09/08	0920	199909895	94/01525	0.029	21.00	1.85	7.41	0	9.56
		99/10/18	1330	199912965	94/01579	0.504	10.70	1.41	6.63	0	20.10
SC-DEN2	Dennis Str @ Old Hwy 1	99/08/22	1645	199908894	94/00591	0.021	18.50	1.19	6.96	0	7.38
		99/10/19	1355	199913057	94/01588						
SC-DEN2A	Dennis Str 30m below Billy Weston inlet	99/10/19	1340	199913055	94/01586						
		99/10/19	1340	199913062	94/01586						
SC-DEN2B	Dennis Str @ old Shore Line RR crossing	99/10/19	1330	199913057	94/01585						
SC-DEN5	Dennis Str @ Rte 750 above Moore Mills Lk	99/06/23	1115	199904897	94/00430	0.098	5.42	2.45	3.51	0	6.66
		99/08/22	1625	199908904	94/00604	0.045	9.70	2.34	4.27	0	6.35
		99/09/27	1920	199911154	94/01562	0.242	6.73	1.96	6.03	0	8.21
SC-BILL1	Billy Weston Brk nr mouth @ RR tracks	99/08/23	1415	199908981	94/00675	0.118	58.60	4.76	26.80	0.112	288.00
		99/09/15	1125	199910261	94/00478	0.110	54.90	4.02	29.90	0	407.00
		99/10/19	1420	199913052	94/01580						
		99/10/19	1420	199913059	94/01580						
SC-BILL1A	Billy Weston Brk behind Mall	99/09/15	1140	199910262	94/00479	0.491	78.40	6.16	32.60	0	24.10
		99/10/19	1405	199913056	94/01582						
SC-BILL1B	Billy Weston Brk above mall entrance	99/10/19	1410	199913053	94/01583						
		99/10/19	1410	199913060	94/01583						
SC-BILL1C	Billy Weston Brk, bend @ traffic circle	99/10/19	1415	199913054	94/01584						
		99/10/19	1415	199913061	94/01584						
SC-BILL2	Billy Weston Brk @ St. Stephen Drive	99/08/23	1340	199908980	94/00676	0.064	18.20	1.48	5.96	0	3.78

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	AL ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	CD ug/l as Cd	Cl mg/l as Cl-
SC-MEAD1	Meadow Brk @ Ledge Rd, Oak Bay	99/08/23	1750	199908983	94/00678	0.023	59.70	1.99	22.80	0	29.50
		99/10/18	1300	199912966	94/01680	0.203	32.50	0	14.30	0	19.10
SC-MEAD4	Meadow Brk @ Old Hwy 1	99/08/23	1430	199908982	94/00679	0.084	71.10	1.41	31.60	0	26.80
SC-HAT2	Hatchery Str @ Ledge Rd, Oak Bay	99/08/23	1445	199908984	94/00681	0.019	73.00	1.04	33.30	0	34.40
SC-BENS1	Benson's Corner Str @ Ledge Rd, Oak Bay	99/06/29	0725	199905189	94/00501	0.040	54.80	4.50	21.60	0	44.70
		99/09/26	1510	199910943	94/00480	0.317	14.10	2.10	9.71	0	33.40
SC-PARK1	Park Str @ campground rd, Oak Bay	99/10/18	750	199912829	94/01573	0.200	35.90	0	22.90	0	110.00
SC-GALL1	Gallop Str above Rte 755 bridge	99/06/23	0735	199904890	99/00423	0.080	8.27	1.4	4.26	0	2.40
		99/07/18	1520	199906590	94/00514	0.130	10.20	1.85	4.55	0	2.19
		99/08/06	1930	199907780	94/01382	0.117	8.84	1.7	4.51	0	1.67
		99/08/22	1405	199908898	94/00598	0.125	9.87	1.73	4.54	0	1.68
		99/09/07	1940	199909894	94/01524	0.042	21.70	1.74	10.10	0	3.29
		99/10/18	1240	199912964	94/01578	0.407	6.68	1.25	7.41	0	2.87
SC-COTT2	Cottrell Brk @ Old Hwy 1	99/07/07	1900	199905818	94/00507	0.068	29.20	3.94	11.70	0	21.90
SC-WAW1	Waweig R above head-of-tide	99/06/23	~25	199904887	94/00420	0.049	12.30	1.4	5.90	0	7.26
		99/07/18	1500	199906589	94/00511	0.039	13.00	2.13	5.55	0	8.34
		99/08/06	1950	199907781	94/01383	0.048	11.60	2.14	5.75	0	6.75
		99/08/22	1350	199908895	94/00595	0.032	13.00	1.81	5.59	0	6.11
		99/09/07	1830	199909893	94/01523	0.040	11.10	2.6	5.69	0	12.60
		99/10/18	1155	199912961	94/01575	0.269	7.29	1.26	5.01	0	5.01
SC-WAW3	Waweig R @ Rte 760 (Roix Rd)	99/06/23	0710	199904888	94/00421	0.090	12.70	1.5	5.20	0	2.73
		99/08/22	1330	199908896	94/00596	0.038	12.60	1.99	5.14	0	4.99
		99/10/18	1215	199912962	94/01576	0.104	5.75	0	4.74	0	6.62
SC-POUT2	Pout Brk @ Rte 760 (Roix Rd)	99/06/23	0655	199904889	94/00422	0.069	10.60	1.94	4.73	0	5.22
		99/08/22	1325	199908897	94/00597	0.062	15.50	1.75	6.38	0	2.54
		99/10/18	1225	199912963	94/01577	0.164	7.88	0	4.30	0	4.70
SC-GOLD1	Goldsmith's Str @ Rte 127	99/07/07	1945	199905820	94/00509	0.019	11.00	0	4.45	0	6.38
		99/08/29	1905	199909313	94/00690	0.016	14.40	0	6.13	0	9.53
SC-GOLD2	Goldsmith's Str @ Hwy 1	99/07/07	1915	199905819	94/00508	0.015	8.05	0	3.29	0	3.96
SC-GRLAW	Greenlaw Brk @ Rte 127	99/08/29	1920	199909314	99/00672	0.047	30.50	1.28	9.90	0	2.97

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Location	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	AL ug/l as Al	Alk-G mg/l as CaCO3	As ug/l as As	Ca-D ug/l as Ca	CD ug/l as Cd	Cl mg/l as Cl-
SC-JOHN1	Johnson's Str nr mouth	99/09/26	1435	199910946	94/00484	0.400	15.00	0	6.97	0	12.10
SC-POT1	Pottery Crk north branch, above Joes Pt. Rd.	99/06/29	0655	199905188	94/00500	0.524	23.80	2	10.70	0	8.98
		99/08/24	0725	199908992	94/00614	0.334	57.60	3.46	24.00	0	18.00
		99/09/26	1355	199910941	94/00700	0.456	76.00	5.69	38.80	0	48.30
		99/10/17	1905	199912827	94/01565	0.234	44.60	2.56	20.60	0	17.50
SC-POT2	Pottery Crk center branch, above Joes Pt. Rd	99/08/24	0725	–	–						
		99/09/26	1401	199910942	94/00481	0.219	90.00	3.49	49.50	0	337.00
		99/10/17	1910	199912828	94/01566	0.018	136.00	2.18	68.40	0	78.10
ESTUARY DATA											
SC-EWAW1		99/09/22	1225		94/00694						
SC-EWAW2		99/09/22	1211		94/00693						
SC-EWAW3		99/09/22	1155		94/00692						
SC-EWAW4		99/09/22	1055		94/00691						
SC-ESCR1		99/09/22	1231		94/00695						
SC-ESCR2		99/09/22	1242		94/00696						
SC-ESCR4		99/09/22	1254		94/00697						
SC-ESCR6		99/09/22	1305		94/00698						
SC-ESCR8		99/10/27	1030	199967977	94/01590						
SC-ESCR9		99/09/22	1315		94/00699						
		99/10/27	1040	199967976	94/01589						

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-MON2	99/06/28	2032	199905181	94/00493	50	71.20	0.0017	0	11.10	50	0	0.18	27.7	0.249
	99/07/19	1755	--	--										
	99/08/23	1325	199906985	94/00620	50	89.70	0.0023	0.0005	14.80	<10	0	0.12	39.4	0.306
SC-MON1A	99/07/19	1744	199906674	94/00551	40	83.30	0.0014	0.0007	12.40	40	0	0.11	38.5	0.307
	99/08/23	1335	199908986	99/00607	70	86.00	0.0021	0	16.80	<10	0	0.15	38.8	0.335
	99/09/27	1150	199911158	94/00664	100	59.60	0.0012	0.0008	27.10	50	0	0.27	28.7	0.200
	99/10/17	1345	199912818	94/00665	75	52.80	0.0021	0.008	23.90	80	0	0.17	25.8	0.200
SC-MON1	99/08/23	1735	199908987	99/00609	150	67.10	0.0026	0	28.10	40	0	0.31	35.4	0.274
	99/09/27	1230	199911155	94/00663	200	43.80	0.0016	0.0007	30.40	10	0	0.31	23.3	
	99/10/17	1220	199912817	94/00667	100	39.40	0.0019	0.0005	26.80	40	0	0.20	20.9	0.167
SC-HAY1	99/07/11	1719	199905987	94/00513	100	36.80	0.0012	0.0006	19.00	80	0	0.46	15.6	0.768
SC-NMILL1	99/07/11	1705	199905993	94/00519	50	30.30	0.001	0.0009	11.20	30	0	0.28	12.7	0.450
SC-EGTR1	99/07/11	1740	199905985	94/00510	60	78.20	0.0016	0.0006	14.50	1650	0	0.28	30.7	0.286
	99/08/23	1855	199908988	94/00610	70	83.20	0.0019	0.0008	19.00	20	0	0.14	33.7	0.361
SC-FC1	99/06/25	1442	199905172	94/00487	0	36.50	0.0007	0	3.72	--	0	0	12.1	0.317
	99/06/28	2114		94/00495						50				
	99/07/19	1602	199906673	94/00550	0	37.70	0	0	3.52	<10	0	0	13.3	0.340
	99/08/05	1605	199907771	94/01373	0	36.50	0	0	3.15	--	0	0	14.6	0.355
	99/08/23	1930	199908989	94/00611	5	37.00	0.0007	0	3.97	<10	0	0	13.1	0.383
	99/09/09	2000	199909940	94/01530	5	38.20	0	0	3.62	<10	0	0	13.2	0.445
	99/10/17	1425	199912819	94/00669	5	37.20	0.0009	0	3.58	<10	0	0	13.7	0.317
SC-MUD1	99/06/25	1415	199905171	94/00486	5	37.50	0.0008	0	4.05	--	0	0	11.8	0.352
SC-SMED	99/06/25	1346	199905170	94/00485	50	48.40	0.0016	0.0007	10.40	--	0	0.15	19.4	0.536
	99/06/28	2133	199905184	94/00496						90				
SC-PIR1	99/09/27	1455	199911156	94/00666	150	36.00	0.0010	0.0009	24.00	30	0	0.31	15.7	0.259
SC-MUSQ1	99/08/29	1543	199909312	99/00608	5	54.80	0.0009	0	4.18	50	0	0.41	21.3	0.462
SC-BOLT1	99/08/17	1605	199908558	94/00590	40	28.50	0	0	8.06	10	0	0.13	10.6	0.301
SC-EBRK 1	99/08/17	1520	199908556	94/00522	10	22.30	0.0005	0	4.72	10	0	0.05	7.2	0.233

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-PAL1	99/06/28	2200	199905182	94/00494	40	36.80	0.0009	0.0005	7.04	30	0	0.11	12.3	0.426
	99/07/19	1901	199906675	94/00549	30	36.00	0.0006	0	7.56	10	0	0.09	12.7	0.368
	99/08/23	2025	199908990	94/00612	70	35.50	0.0005	0	14.80	40	0	0.13	14.3	0.393
	99/09/27	1830	199911157	94/00668	100	27.90	0.0005	0.0005	20.60	30	0	0.16	11.7	0.319
	99/10/17	1500	199912820	94/01670	75	28.40	0.0007	0.0006	21.00	40	0	0.16	11.3	0.320
SC-DEAD1	99/06/28	2220	199905185	94/00497	100	47.10	0.0019	0	13.40	60	0.139	0.52	15.5	0.637
	99/07/19	1325	--	--										
SC-THIRD1	99/06/28	2240	199905186	94/00498	70	22.40	0.0008	0.0005	9.89	<10	0	0.25	6.7	0.197
	99/07/19	1923	199906676	94/00548	40	23.20	0.0006	0	9.63	30	0	0.46	7.6	0.240
SC-WBEV1	99/07/11	2030	199905986	94/00512	250	45.30	0.0009	0.0006	30.70	110	0	0.65	14.1	0.196
SC-MCAD1	99/07/11	2000	199905992	94/00520	250	23.60	0.0007	0	32.80	<10	0	0.74	10.6	0.107
SC-DIGY1	99/06/28	2305	199905187	94/00499	40	28.10	0	0.0005	6.90	30	0	0.11	6.7	0.388
	99/07/19	1940	199906677	94/00547	30	28.60	0	0	7.23	100	0	0.09	7.4	0.407
	99/08/05	1750	199907772	94/01374	20	27.80	0	0	6.77	--	0	0.09	8.1	0.538
	99/08/23	2045	199908991	94/00613	30	29.90	0	0.001	6.87	10	0	0.06	8.1	0.397
	99/09/08	1920	199909899	94/01529	30	30.60	0	0	7.22	20	0	0.07	8.0	0.554
	99/10/17	1520	199912821	94/01574	30	29.20	0.0005	0	9.11	10	0	0.07	7.9	0.446
SC-RVB	99/06/23	1205	199904898	94/00431	15	28.00	0	0	5.67	<10	0	0	9.6	0.310
	99/07/18	2055	199906588	94/00553	10	30.30	0.0005	0	4.73	<10	0	0	8.9	0.330
	99/08/05	1925	199907774	94/01378	5	30.30	0	0.0006	4.43	--	0	0	10.6	0.343
	99/08/22	1825	199908893	94/00606	5	30.10	0	0	4.42	<10	0	0	10.5	0.256
	99/09/08	1755	199909898	94/01528	5	31.80	0	0	4.63	<10	0	0	10.4	0.260
	99/10/17	1535	199912822	94/01563	10	32.40	0.0005	0	5.46	<10	0	0	11.0	0.293
SC-RWING	99/06/23	1300	199904911	94/00449	10	28.40	0	0	4.88	<10	0	0	9.2	0.306
	99/07/18	2027	199906587	94/00552	10	30.10	0.0005	0.0005	4.86	10	0	0	9.0	0.325
	99/08/05	1820	199907773	94/01375	10	29.60	0	0	4.34	--	0	0	10.5	0.332
	99/08/22	1745	199908892	94/00605	10	30.10	0	0	4.65	<10	0	0	10.8	0.280
	99/09/08	1640	199909897	94/01527	5	31.70	0	0	4.71	<10	0	0	10.6	0.258
	99/10/17	1605	199912823	94/01564	10	31.50	0.0006	0	5.70	<10	0	0	11.0	0.310
SC-RBEAC	99/10/17	1705	199912824	94/01567	15	33.10	0.0006		7.29	<10	0	0.06	11.7	0.300
SC-CAN2	99/06/23	1030	199904896	94/00429	80	46.50	0.0009	0.0005	13.50	20	0	0.20	19.2	0.282
	99/07/18	1750	199906596	94/00546	150	46.30	0.0007	0	15.00	60	0	0.26	17.4	0.254
	99/08/05	2030	199907775	94/01377	100	45.20	0.0006	0.0007	15.50	--	0	0.33	18.8	0.362
	99/08/17	2110	199908559	94/00592	100	42.50	0.0006	0	15.20	50	0	0.23	16.7	0.271
	99/09/26	1815	199910948	94/01561	100	60.40	0.001	0.0007	24.30	20	0	0.21	28.0	0.240
	99/10/17	1735	199912825	94/01568	100	63.30	0.0012	0.0007	23.50	10	0	0.19	27.5	0.298

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-CAN1	99/08/17	2000	199908557	94/00559	150	44.10	0.0006	0	15.60	10	0	0.21	17.9	0.277
SC-KING2	99/10/17	1750	199912826	94/01569	100	89.90	0.0029	0.009	24.90	20	0	0.13	43.7	0.195
SC-RGLEAS	99/06/23	0950	199904895	94/00428	30	32.20	0.0006	0.0005	6.67	40	0	0.09	11.6	0.307
	99/07/18	1720	199906595	94/00545	20	32.80	0	0	5.68	90	0	0.06	9.7	0.278
	99/08/22	1550	199908903	94/00603	20	30.70	0	0.0005	5.05	<10	0	0	10.4	0.247
	99/09/26	1729	199910947	94/01560	75	45.30	0.0008	0.0008	22.00	10	0	0.19	19.4	0.250
	99/10/18	1715	199912971	94/01570	50	37.30	0.0011	0	12.80	10	0	0.09	12.8	0.404
SC-RWOOD	99/08/30	1105	199909407	94/00615	15	32.40	0.0005	0	5.11	<10	0	0.08	10.3	0.464
SC-RGRAS	99/07/07	1340	199905814	94/00503	40	36.30	0	0.0006	6.47	10	0	0.26	11.7	0.481
	99/08/30	1135	199909408	99/00616	10	31.00 7.00	0.0005	0	4.95	<10	0	0.07	10.5	0.476
SC-RBUTL	99/07/07	1430	199905813	94/00504	40	84.60	0.0006	0.0007	7.43	20	0	0.21	14.8	1.190
	99/08/30	1220	199909409	94/00617	20	102.00	0.0011	0.0005	7.44	10	0	0.08	17.6	1.390
SC-RUPM	99/06/23	0910	199904894	94/00427	60	74.30	0.0009	0.0006	8.86	10	0	0.19	14.2	0.806
	99/07/18	1645	199906594	94/00544	40	103.00	0.0008	0.0011	8.82	10	0	0.18	16.6	1.160
	99/08/06	1630	199907776	94/01378	20	107.00	0.0007	0.0011	7.76	--	0	0.18	18.9	1.360
	99/08/30	1325	199909410	94/00618	20	110.00	0.0011	0.0005	7.39	<10	0	0.08	18.8	1.460
	99/09/15	1050	199910264	94/01547	20	79.10	0.0015	0.0005	5.62	<10	0	0.12	15.4	1.190
	99/10/18	1635	199912969	94/01567	30	51.40	0.0011	0.0005	7.40	10	0	0.14	12.2	0.703
SC-MOH1	99/06/23	0850	199904893	94/00426	140	45.70	0.001	0.0007	16.70	10	0	0.52	17.6	0.222
	99/07/18	1630	199906593	94/00543	70	49.80	0.0008	0.0005	11.40	20	0	0.44	17.1	0.216
	99/08/06	1705	199907777	94/01379	40	56.60	0.0009	0	8.60	--	0	0.29	21.9	0.316
	99/08/22	1500	199908901	94/00601	40	57.10	0.0007	0	9.62	60	0	0.25	20.0	0.259
	99/09/26	1645	199910945	94/00483	250	54.80	0.0011	0.0011	30.80	90	0	0.58	22.3	0.508
	99/10/18	1645	199912970	94/01571	150	49.70	0.0014	0.0008	23.20	190	0	0.54	18.3	0.423
SC-MOH2	99/08/22	1520	199908902	94/00602	60	56.10	0.0008	0.0005	11.90	10	0	0.37	20.1	0.246
SC-MOH3	99/09/26	1700	199910944	94/00482	200	55.10	0.0013	0.001	30.50	120	0	0.58	23.1	0.473
SC-DOOD2	99/07/07	1700	199905815	94/00502	40	124.00	0.0036	0.0007	4.23	110	0	0.96	48.8	0.665
SC-RMTB	99/06/23	830	199904892	94/00425	40	113.00	0.0011	0.0008	9.96	90	0	0.20	18.1	1.200
	99/07/18	1620	199906592	94/00554	40	121.00	0.001	0.0007	9.27	10		0.18	18.0	1.410
	99/08/06	1730	199907778	94/01380	30	118.00	0.0008	0.0006	7.94	--	0	0.17	20.0	1.510
	99/08/22	1445	199908900	94/00600	20	73.90	0.0006	0.0005	6.86	50	0	0.10	14.1	0.813
	99/09/08	1010	199909896	94/01526	20	132.00	0	0.0006	7.67	<10	0	0.09	22.7	2.010
	99/10/18	1558	199912968	94/01572	40	70.70	0.0015	0.0008	9.26	80	0	0.24	17.3	0.910

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-TAN1	99/07/07	1723	199905817	94/00506						160				
	99/10/18	1545	199912972	94/01581	60	166.00	0.0033	0.015	13.30	>24190	0	0.77	43.7	2.210
SC-TAN2	99/07/07	1710	199905816	94/00505						190				
	99/10/18	1535	199912967	94/00677	100	152.00	0.0033	0.0036	14.40	1440	0	0.91	42.2	1.620
SC-DEN1	99/06/23	0805	199904891	94/00424	50	85.50	0.0009	0.0008	8.66	240	0	0.31	18.6	0.387
	99/07/18	1555	199906591	94/00521	40	133.00	0.0011	0.0015	7.08	30		0.20	25.1	0.652
	99/08/06	1850	199907779	94/01381	30	118.00	0.001	0.0008	6.18	--	0	0.22	28.0	0.741
	99/08/22	1430	199908899	94/00599	40	90.80	0.0008	0.0006	7.92	10	0	0.19	22.5	0.513
	99/09/08	0920	199909895	94/01525	30	92.70	0	0.0005	6.40	30	0	0.20	24.2	0.583
	99/10/18	1330	199912965	94/01579	150	114.00	0.0017	0.0019	13.20	700	0	0.57	23.3	0.803
SC-DEN2	99/08/22	1645	199908894	94/00591	30	77.10	0.0007	0	5.94	80	0	0.09	22.9	0.319
	99/10/19	1355	199913057	94/01588						30				
SC-DEN2A	99/10/19	1340	199913055	94/01586						140				
	99/10/19	1340	199913062	94/01586						190				
SC-DEN2B	99/10/19	1330	199913057	94/01585						90				
SC-DEN5	99/06/23	1115	199904897	94/00430	100	50.00	0.0007	0.0005	14.60	20	0	0	11.2	0.214
	99/08/22	1625	199908904	94/00604	60	53.30	0	0	13.30	30	0	0.14	14.4	0.216
	99/09/27	1920	199911154	94/01562	150	64.30	0.0009	0.0008	28.60	80	0	0.32	19.6	0.344
SC-BILL1	99/06/23	1415	199908981	94/00675	50	1120.00	0.0055	0.0011	12.20	>2000	0.103	1.41	86.1	5.040
	99/09/15	1125	199910261	94/00478	100	1460.00	0.0054	0.0076	11.60	>2000	0.13	1.25	93.9	8.870
	99/10/19	1420	199913052	94/01580						240				
	99/10/19	1420	199913059	94/01580						170				
SC-BILL1A	99/09/15	1140	199910262	94/00479	30	299.00	0.0064	0.0026	6.89	150	0.174	1.06	90.8	19.700
	99/10/19	1405	199913056	94/01582						30				
SC-BILL1B	99/10/19	1410	199913053	94/01583						160				
	99/10/19	1410	199913060	94/01583						160				
SC-BILL1C	99/10/19	1415	199913054	94/01584						140				
	99/10/19	1415	199913061	94/01584						60				
SC-BILL2	99/08/23	1340	199908980	94/00676	60	70.40	0.0013	0.025	9.88	40	0	0.94	25.7	0.510

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-MEAD1	99/08/23	1750	199908983	94/00678	30	231.00	0.0046	0.0006	7.27	30	0	0.38	72.0	0.973
	99/10/18	1300	199912966	94/01680	40	155.00	0.0034	0.0009	8.60	20	0	0.44	46.3	1.130
SC-MEAD4	99/08/23	1430	199908982	94/00679	20	259.00	0.0048	0.0005	2.51	40	0	0.38	95.9	0.899
SC-HAT2	99/08/23	1445	199908984	94/00681	10	288.00	0.0044	0	2.05	<10	0	0.10	101.8	0.943
SC-BENS1	99/06/29	0725	199905189	94/00501	30	272.00	0.0034	0.0014		140	0	0.74	70.4	0.810
	99/09/26	1510	199910943	94/00480	30	179.00	0.0019	0.0018	8.12	700	0	0.42	33.1	0.939
SC-PARK1	99/10/18	750	199912829	94/01573	15	491.00	0.0041	0.002	7.56	190	0	0.41	72.3	1.850
SC-GALL1	99/06/23	0735	199904890	99/00423	30	45.30	0.0006	0.0007	5.99	<10	0	0.33	14.1	0.373
	99/07/18	1520	199906590	94/00514	30	50.00	0.0008	0.0009	6.08	20	0	0.33	14.9	0.493
	99/08/06	1930	199907780	94/01382	60	39.10	0	0.0008	11.90	30	0	0.31	14.7	0.394
	99/08/22	1405	199908898	94/00598	70	43.20	0.0005	0.0007	11.20	30	0	0.39	14.9	0.314
	99/09/07	1940	199909894	94/01524	20	96.10	0	0.0008	5.66	<10	0	0.30	33.1	0.916
	99/10/18	1240	199912964	94/01578	50	69.80	0.0013	0.0009	9.85	90	0	0.42	24.2	0.830
SC-COTT2	99/07/07	1900	199905818	94/00507	150	143.00	0.0037	0.0009	11.10	160	0	2.17	38.4	0.860
SC-WAW1	99/06/23	0625	199904887	94/00420	20	66.80	0.0009	0.0006	6.78	30	0	0.19	19.2	0.480
	99/07/18	1500	199906589	94/00511	20	73.00	0.0007	0.0006	5.67	30	0	0.10	17.9	0.589
	99/08/06	1950	199907781	94/01383	20	65.60	0.0006	0.0005	7.06	--	0	0.15	18.6	0.642
	99/08/22	1350	199908895	94/00595	30	64.60	0.0006	0	7.44	20	0	0.15	18.3	0.470
	99/09/07	1830	199909893	94/01523	20	79.60	0	0.0005	6.04	10	0	0.10	18.4	0.634
	99/10/18	1155	199912961	94/01575	50	57.20	0.0016	0.0009	9.92	360	0	0.34	17.0	0.711
SC-WAW3	99/06/23	0710	199904888	94/00421	40	50.90	0.0011	0.0005	10.20	180	0	0.42	16.9	0.485
	99/08/22	1330	199908896	94/00596	20	57.50	0.0006	0	5.51	<10	0	0.22	16.6	0.362
	99/10/18	1215	199912962	94/01576	40	54.50	0.0010	0.0006	9.00	310	0	0.17	15.7	0.536
SC-POUT2	99/06/23	0655	199904889	94/00422	15	52.90	0.0009	0.0006	5.56	60	0	0.29	15.2	0.348
	99/08/22	1325	199908897	94/00597	60	53.30	0.0009	0	11.00	320	0	0.47	20.4	0.585
	99/10/18	1225	199912963	94/01577	50	47.50	0.0011	0.007	13.60	110	0	0.30	14.4	0.755
SC-GOLD1	99/07/07	1945	199905820	94/00509	20	53.80	0	0.0007	5.83	30	0	0.37	14.6	0.263
	99/08/29	1905	199909313	94/00690	10	76.20	0.0005	0.0007	5.73	50	0	0.32	19.7	0.414
SC-GOLD2	99/07/07	1915	199905819	94/00508	20	40.20	0.0006	0	5.98	10	0	0.18	11.0	0.164
SC-GRLAW	99/08/29	1920	199909314	99/00672	60	83.40	0.0012	0.0005	13.00	<10	0	0.43	32.2	0.549

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Color as color units	Cond uS/cm	CR ug/l as Cr	CU ug/l as Cu	TOC mg/l as C	E. coli as CFU/100ml	F mg/l as F	FE mg/l as Fe	HARD mg/l as CaCO3	K mg/l as K
SC-JOHN1	99/09/26	1435	199910946	94/00484	40	91.30	0.0016	0.0017	9.02	100	0	0.49	24.9	0.760
SC-POT1	99/06/29	0655	199905188	94/00500	150	92.20	0.0017	0.0025	2.34	340	0	0.44	30.8	0.602
	99/08/24	0725	199908992	94/00614	30	189.00	0.0039	0.0016	4.13	30	0	0.31	68.0	1.570
	99/09/26	1355	199910941	94/00700	60	339.00	0.0055	0.0029	7.83	120	0	1.03	111.5	4.260
	99/10/17	1905	199912827	94/01565	10	171.00	0.0041	0.0014	4.04	100	0	0.33	58.6	1.600
SC-POT2	99/08/24	0725	--	--										
	99/09/26	1401	199910942	94/00481	15	1340.00	0.0048	0.0036	6.52	>2000	0	0.16	229.0	9.700
	99/10/17	1910	199912828	94/01566	0	562.00	0.012	0.0011	4.22	160	0	0	189.5	1.780

ESTUARY DATA

SC-EWAW1	99/09/22	1225	94/00694	<10	
SC-EWAW2	99/09/22	1211	94/00693	50	
SC-EWAW3	99/09/22	1155	94/00692	120	
SC-EWAW4	99/09/22	1055	94/00691	150	
SC-ESCR1	99/09/22	1231	94/00695	160	
SC-ESCR2	99/09/22	1242	94/00696	430	
SC-ESCR4	99/09/22	1254	94/00697	1440	
SC-ESCR6	99/09/22	1305	94/00698	1440	
SC-ESCR8	99/10/27	1030	199967977	94/01590	250
SC-ESCR9	99/09/22	1315		94/00699	220
	99/10/27	1040	199967976	94/01589	310

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	Nl mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-MON2	99/06/28	2032	199905181	94/00493	1.170	0.048	1.71	0.012	0	0	0	0	0	7.72
	99/07/19	1755	--	--										
	99/08/23	1325	199908985	94/00620	1.690	0.040	2.47	0.010	0	0	0	0	0	7.52
SC-MON1A	99/07/19	1744	199906674	94/00551	1.600	0.046	2.29	0.012	0	0	0	0	0	7.76
	99/08/23	1335	199908986	99/00607	1.650	0.058	2.16	0.012	0	0	0.05	0.05	0	7.41
	99/09/27	1150	199911158	94/00664	1.120	0.031	1.73	0.011	0	0	0	0	0	6.90
	99/10/17	1345	199912818	94/00665	1.020	0.012	1.45	0	0	0	0	0	0	6.94
SC-MON1	99/08/23	1735	199908987	99/00609	1.430	0.096	1.02	0.014	0	0	0	0	0	7.01
	99/09/27	1230	199911155	94/00663	0.930	0.051		0.015	0	0	0	0	0	6.55
	99/10/17	1220	199912817	94/00667	0.860	0.024	0.79	0	0	0	0	0	0	6.68
SC-HAY1	99/07/11	1719	199905987	94/00513	0.910	0.076	1.54	0.077	0	0	0.05	0.05	0	7.04
SC-NMILL1	99/07/11	1705	199905993	94/00519	0.820	0.031	1.32	0	0	0	0.45	0.45	0	7.05
SC-EGTR1	99/07/11	1740	199905985	94/00510	1.220	0.050	4.04	0.012	0	0	0	0	0	7.40
	99/08/23	1855	199908988	94/00610	1.340	0.021	4.59	0	0	0	0	0	0	7.53
SC-FC1	99/06/25	1442	199905172	94/00487	0.560	0	1.31	0	0	0	0	0	0	7.43
	99/06/28	2114		94/00495										
	99/07/19	1602	199906673	94/00550	0.620	0.005	1.31	0.010	0	0	0	0	0	7.46
	99/08/05	1605	199907771	94/01373	0.700	0.007	1.47	0	0	0	0	0	0	7.18
	99/08/23	1930	199908989	94/00611	0.630	0	1.39	0	0	0	0	0	0	7.42
	99/09/09	2000	199909940	94/01530	0.670	0.007	1.47	0	0	0	0	0	0	6.96
	99/10/17	1425	199912819	94/00669	0.650	0.0063	1.41	0	0	0	0	0	0	7.26
SC-MUD1	99/06/25	1415	199905171	94/00486	0.590	0	1.35	0.023	0	0	0	0	0	7.42
SC-SMED	99/06/25	1346	199905170	94/00485	0.980	0.038	1.80	0.027	0	0	0.11	0.11	0	7.29
	99/06/28	2133	199905184	94/00496										
SC-PIR1	99/09/27	1455	199911156	94/00666	0.750	0.025	1.52	0.014	0	0	0	0	0	6.50
SC-MUSQ1	99/08/29	1543	199909312	99/00608	0.970	0.284	2.08	0.016	0	0	0	0	0	7.33
SC-BOLT1	99/08/17	1605	199908558	94/00590	0.520	0.074	1.42	0.011	0	0	0	0	0	6.94
SC-EBRK 1	99/08/17	1520	199908556	94/00522	0.400	0.008	1.02	0	0	0	0	0	0	6.68

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	NI mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-PAL1	99/06/28	2200	199905182	94/00494	0.520	0.025	1.40	0	0	0	0.05	0.05	0	7.41
	99/07/19	1901	199906675	94/00549	0.520	0.024	1.46	0.016	0	0	0	0	0	7.45
	99/08/23	2025	199908990	94/00612	0.640	0.017	1.54	0	0	0	0	0	0	7.19
	99/09/27	1830	199911157	94/00668	0.530	0.012	1.40	0	0	0	0	0	0	6.29
	99/10/17	1500	199912820	94/01670	0.560	0.012	1.25	0	0	0	0	0	0	6.14
SC-DEAD1	99/06/28	2220	199905185	94/00497	0.800	0.350	2.68	0.046	0	0	0	0	0	7.30
	99/07/19	1325	--	--										
SC-THIRD1	99/06/28	2240	199905186	94/00498	0.360	0.063	1.22	0	0	0	0	0	0	6.91
	99/07/19	1923	199906676	94/00548	0.400	0.197	1.24	0.027	0	0	0	0	0	7.01
SC-WBEV1	99/07/11	2030	199905986	94/00512	0.730	0.037	4.26	0.019	0	0	0	0	0	5.94
SC-MCAD1	99/07/11	2000	199905992	94/00520	0.610	0.050	1.30	0.024	0	0	0	0	0	5.50
SC-DIGY1	99/06/28	2305	199905187	94/00499	0.360	0.035	1.87	0.011	0	0	0	0	0	6.93
	99/07/19	1940	199906677	94/00547	0.390	0.021	1.99	0.011	0	0	0	0	0	6.97
	99/08/05	1750	199907772	94/01374	0.460	0.021	2.28	0	0	0	0	0	0	6.87
	99/08/23	2045	199908991	94/00613	0.450	0.017	2.23	0	0	0	0	0	0	7.01
	99/09/08	1920	199909899	94/01529	0.470	0.045	2.33	0	0	0	0	0	0	6.54
	99/10/17	1520	199912821	94/01574	0.440	0.022	2.18	0	0	0	0	0	0	6.73
SC-RVB	99/06/23	1205	199904898	94/00431	0.480	0.014	1.40	0	0	0	0	0	0	7.05
	99/07/18	2055	199906588	94/00553	0.430	0.010	1.40	0	0	0	0	0	0	7.24
	99/08/05	1925	199907774	94/01376	0.530	0.013	1.43	0	0	0	0	0	0	7.00
	99/08/22	1825	199908893	94/00606	0.560	0.008	1.45	0	0	0	0	0	0	7.24
	99/09/08	1755	199909898	94/01528	0.530	0.013	1.40	0	0	0	0	0	0	6.70
	99/10/17	1535	199912822	94/01563	0.540	0.011	1.66	0	0	0	0	0	0	7.05
SC-RWING	99/06/23	1300	199904911	94/00449	0.460	0.018	1.44	0.010	0	0	0	0	0	7.10
	99/07/18	2027	199906587	94/00552	0.450	0.013	1.36	0.012	0	0	0	0	0	7.22
	99/08/05	1820	199907773	94/01375	0.520	0.015	1.42	0	0	0	0	0	0	7.02
	99/08/22	1745	199908892	94/00605	0.560	0.008	1.44	0	0	0	0	0	0	7.27
	99/09/08	1640	199909897	94/01527	0.550	0.009	1.44	0	0	0	0	0	0	6.74
	99/10/17	1605	199912823	94/01564	0.540	0.013	1.49	0	0	0	0	0	0	7.06
SC-RBEAC	99/10/17	1705	199912824	94/01567	0.570	0.009	1.62	0	0	0	0	0	0	7.01
SC-CAN2	99/06/23	1030	199904896	94/00429	1.170	0.063	2.29	0.013	0	0	0	0	0	7.33
	99/07/18	1750	199906596	94/00546	1.040	0.072	2.31	0	0	0	0	0	0	7.32
	99/08/05	2030	199907775	94/01377	1.160	0.063	2.54	0	0	0	0	0	0	7.19
	99/08/17	2110	199908559	94/00592	1.000	0.060	2.36	0.017	0	0	0	0	0	7.13
	99/09/26	1815	199910948	94/01561	1.570	0.050	1.89	0	0	0	0	0	0	6.93
	99/10/17	1735	199912825	94/01568	1.600	0.018	2.40	0	0	0	0.08	0.08	0	7.15

APPENDIX 5a(cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	Ni mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-CAN1	99/08/17	2030	199908557	94/00559	1.040	0.058	2.38	0.016	0	0	0	0	0	7.26
SC-KING2	99/10/17	1750	199912826	94/01569	2.620	0	1.90	0.016	0	0	0.06	0.06	0	7.48
SC-RGLEAS	99/06/23	0950	199904895	94/00428	0.610	0.033	1.56	0	0	0	0	0	0	7.10
	99/07/18	1720	199906595	94/00545	0.490	0.018	1.65	0.011	0	0	0	0	0	7.22
	99/08/22	1550	199908903	94/00603	0.530	0.018	1.47	0	0	0	0	0	0	7.21
	99/09/26	1729	199910947	94/01560	1.060	0.020	1.90	0	0	0	0	0	0	6.62
	99/10/18	1715	199912971	94/01570	0.700	0.012	1.46	0	0	0	0	0	0	6.86
SC-RWOOD	99/08/30	1105	199909407	94/00615	0.580	0.018	2.03	0	0	0	0	0	0	6.90
SC-RGRAS	99/07/07	1340	199905814	94/00503	0.700	0.066	3.11	0.016	0	0	0	0	0	7.19
	99/08/30	1135	199909408	99/00616	0.590	0.016	1.71	0	0	0	0	0	0	7.02
SC-RBUTL	99/07/07	1430	199905813	94/00504	0.840	0.081	10.20	0.089	0	0	0.15	0.15	0	7.32
	99/08/30	1220	199909409	94/00617	0.900	0.061	12.50	0.084	0	0	0.18	0.18	0	7.29
SC-RUPM	99/06/23	0910	199904894	94/00427	0.780	0.064	7.76	0.059	0	0.15	0	0.15	0	7.24
	99/07/18	1645	199906594	94/00544	0.920	0.068	12.90	0.047	0	0	0	0.26	0	7.45
	99/08/06	1630	199907776	94/01378	0.990	0.068	13.80	0.047	0	0	0.31	0.31	0	7.31
	99/08/30	1325	199909410	94/00618	0.900	0.055	14.00	0.040	0	0	0.18	0.18	0	7.32
	99/09/15	1050	199910264	94/01547	0.790	0.054	8.65	0.031	0	0	0.18	0.18	0	6.86
	99/10/18	1635	199912969	94/01587	0.680	0.024	4.05	0.024	0	0	0	0	0	7.09
SC-MOH1	99/06/23	0850	199904893	94/00426	1.180	0.021	2.45	0	0	0	0	0	0	7.23
	99/07/18	1630	199906593	94/00543	1.110	0.026	3.08	0	0	0	0	0	0	7.41
	99/08/06	1705	199907777	94/01379	1.400	0.030	3.31	0	0	0	0	0	0	7.41
	99/08/22	1500	199908901	94/00601	1.360	0.015	3.40	0	0	0	0	0		7.59
	99/09/26	1645	199910945	94/00483	1.530	0.075	2.61	0.017	0	0	0.09	0.09	0	6.13
	99/10/18	1645	199912970	94/01571	1.290	0.016	2.34	0	0	0	0.07	0.07	0	6.63
SC-MOH2	99/08/22	1520	199908902	94/00602	1.430	0.014	3.53	0.019	0	0	0	0	0	7.47
SC-MOH3	99/09/26	1700	199910944	94/00482	1.580	0.086	2.57	0.023	0	0	0.07	0.07	0	6.12
SC-DOOD2	99/07/07	1700	199905815	94/00502	3.360	0.113	5.12	0.041	0	0	0.09	0.09	0	7.73
SC-RMTB	99/06/23	830	199904892	94/00425	0.930	0.092	13.60	0.060	0	0	0.25	0.25	0	7.31
	99/07/18	1620	199906592	94/00554	0.990	0.063	15.50	0.012	0	0	0.26	0.26	0	7.40
	99/08/06	1730	199907778	94/01380	1.050	0.054	15.50	0.010	0	0	0.28	0.28	0	7.40
	99/08/22	1445	199908900	94/00600	0.780	0.030	8.13	0.035	0	0	0.13	0.13	0	7.33
	99/09/08	1010	199909896	94/01526	0.980	0.069	18.20	0.028	0	0	0.28	0.28	0	7.05
	99/10/18	1558	199912968	94/01572	0.970	0.040	6.37	0.032	0	0	0.08	0.08	0	7.15

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	NI mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-TAN1	99/07/07	1723	199905817	94/00506										
	99/10/18	1545	199912972	94/01581	3.390	0.140	12.50	0.830	0	0	3.10	3.10	0	7.11
SC-TAN2	99/07/07	1710	199905816	94/00505										
	99/10/18	1535	199912967	94/00677	3.450	0.148	10.90	1.000	0	0	2.20	2.20	0	7.29
SC-DEN1	99/06/23	0805	199904891	94/00424	1.150	0.029	7.99	0.020	0	0	0	0	0	7.31
	99/07/18	1555	199906591	94/00521	1.560	0.032	15.30	0.015		0	0	0	0	7.62
	99/08/06	1850	199907779	94/01381	1.700	0.045	12.70	0	0	0	0	0	0	7.49
	99/08/22	1430	199908899	94/00599	1.340	0.022	8.85	0	0	0	0	0	0	7.61
	99/09/08	0920	199909895	94/01525	1.380	0.028	8.01	0.010	0	0	0	0	0	7.16
	99/10/18	1330	199912965	94/01579	1.650	0.037	13.00	0.000	0	0	0.10	0.10	0	7.04
SC-DEN2	99/08/22	1645	199908894	94/00591	1.340	0.022	5.95	0	0	0	0	0	0	7.63
	99/10/19	1355	199913057	94/01588										
SC-DEN2A	99/10/19	1340	199913055	94/01586										
	99/10/19	1340	199913062	94/01586										
SC-DEN2B	99/10/19	1330	199913057	94/01585										
SC-DEN5	99/06/23	1115	199904897	94/00430	0.600	0.054	1.91	0.022	0	0	0	0	0	7.05
	99/08/22	1625	199908904	94/00604	0.920	0.026	5.31	0.012	0	0	0	0	0	7.17
	99/09/27	1920	199911154	94/01562	1.110	0.060	5.36	0.026	0	0	0.12	0.12	0	6.29
SC-BILL1	99/08/23	1415	199908981	94/00675	4.660	0.422	180.00	0.430	0.007	1.12	0.20	1.20	1.41	7.22
	99/09/15	1125	199910261	94/00478	4.670	0.917	252.00	0.630	0	0.34	0.42	0.42	0	7.22
	99/10/19	1420	199913052	94/01580						0	0.60			
	99/10/19	1420	199913059	94/01580										
SC-BILL1A	99/09/15	1140	199910262	94/00479	2.280	0.490	13.60	0.350	0	0.42	0.53	0.53	1.53	7.58
	99/10/19	1405	199913056	94/01582										
SC-BILL1B	99/10/19	1410	199913053	94/01583										
	99/10/19	1410	199913060	94/01583										
SC-BILL1C	99/10/19	1415	199913054	94/01584										
	99/10/19	1415	199913061	94/01584										
SC-BILL2	99/08/23	1340	199908980	94/00676	2.630	0.035	3.42	0.016	0.0053	0	0.11	0.11	0	7.37

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	NI mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-MEAD1	99/08/23	1750	199908983	94/00678	3.650	0.148	16.00	0	0	0	0	0	0	7.56
	99/10/18	1300	199912966	94/01680	2.570	0.029	11.20	0	0	0	0	0	0	7.42
SC-MEAD4	99/08/23	1430	199908982	94/00679	4.140	0.186	12.60	0.017	0	0	0.27	0.27	0	7.98
SC-HAT2	99/08/23	1445	199908984	94/00681	4.520	0	16.00	0	0	0	0.20	0.20	0	8.17
SC-BENS1	99/06/29	0725	199905189	94/00501	3.990	0.676	23.70	0.066	0	0	0.18	0.18	0	7.94
	99/09/26	1510	199910943	94/00480	2.140	0.051	21.90	0	0	0	0.10	0.10	0	7.13
SC-PARK1	99/10/18	750	199912829	94/01573	3.680	0.104	61.20	0	0	0	0.21	0.21	0	7.47
SC-GALL1	99/06/23	0735	199904890	99/00423	0.830	0.024	2.75	0	0	0	0.18	0.18	0	7.22
	99/07/18	1520	199906590	94/00514	0.870	0.023	3.04	0	0	0	0.06	0.06	0	7.45
	99/08/06	1930	199907780	94/01382	0.830	0.023	2.59	0	0	0	0	0.00	0	7.02
	99/08/22	1405	199908898	94/00598	0.860	0.026	2.72	0	0	0	0.06	0.06	0	7.25
	99/09/07	1940	199909894	94/01524	1.910	0.035	4.46	0	0	0	1.49	1.49	0	7.14
	99/10/18	1240	199912964	94/01578	1.390	0.066	2.75	0	0	0	0.41	0.41	0	6.82
SC-COTT2	99/07/07	1900	199905818	94/00507	2.240	0.642	12.20	0.172	0	0	0.06	0.06	0	7.22
SC-WAW1	99/06/23	0625	199904887	94/00420	1.080	0.034	5.08	0.022	0	0	0.22	0.22	0	7.28
	99/07/18	1500	199906589	94/00511	0.970	0.047	6.02	0.032	0	0	0.08	0.08	0	7.53
	99/08/06	1950	199907781	94/01383	1.030	0.042	5.48	0.020	0	0	0.12	0.12	0	7.34
	99/08/22	1350	199908895	94/00595	1.050	0.028	5.14	0.037	0	0	0.24	0.24	0	7.46
	99/09/07	1830	199909893	94/01523	1.020	0.029	6.90	0.019	0	0	0.53	0.53	0	6.92
	99/10/18	1155	199912961	94/01575	1.100	0.014	4.41	0.00	0	0	0	0	0	6.88
SC-WAW3	99/06/23	0710	199904888	94/00421	0.960	0.040	3.11	0.012	0	0	0.11	0.11	0	7.20
	99/08/22	1330	199908896	94/00596	0.920	0.051	4.44	0	0	0	0	0	0	7.36
	99/10/18	1215	199912962	94/01576	0.950	0.020	3.90	0	0	0	0	0	0	6.76
SC-POUT2	99/06/23	0655	199904889	94/00422	0.830	0.084	3.77	0.010	0	0	0	0	0	7.14
	99/08/22	1325	199908897	94/00597	1.090	0.035	3.56	0	0	0	0	0	0	7.41
	99/10/18	1225	199912963	94/01577	0.900	0.023	3.04	0	0	0	0.09	0.09	0	6.81
SC-GOLD1	99/07/07	1945	199905820	94/00509	0.850	0.021	4.25	0.012	0	0	0	0	0	7.36
	99/08/29	1905	199909313	94/00690	1.070	0.020	6.53	0.021	0	0	0	0	0	7.29
SC-GOLD2	99/07/07	1915	199905819	94/00508	0.680	0.034	3.01	0.013	0	0	0	0	0	7.10
SC-GRLAW	99/08/29	1920	199909314	99/00672	1.820	0.013	4.54	0.015	0	0	0	0	0	7.51

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	MG-D mg/l as Mg	MN mg/l as Mn	Na mg/l as Na	NH3 mg/l as N	Ni mg/l as Ni	NO2 mg/l as N	NO3 mg/l as N	NOx mg/l as N	PB ug/l as Pb	pH
SC-JOHN1	99/09/26	1435	199910946	94/00484	1.810	0.029	8.11	0	0	0	0.12	0.12	0	7.25
SC-POT1	99/06/29	0655	199905188	94/00500	0.980	0.081	4.45	0	0	0	0.05	0.05	1.39	7.79
	99/08/24	0725	199908992	94/00614	1.970	0.030	9.45	0.014	0	0	0.17	0.17	0	8.02
	99/09/26	1355	199910941	94/00700	3.540	0.091	23.40	0.036	0	0	1.37	1.37	1.07	7.86
	99/10/17	1905	199912827	94/01565	1.750	0.020	8.52	0	0	0	0.40	0.40	0	7.81
SC-POT2	99/08/24	0725	–	–										
	99/09/26	1401	199910942	94/00481	25.600	0.015	217.00	0	0	0	0.93	0.93	0	7.88
	99/10/17	1910	199912828	94/01566	4.540	0.0085	33.20	0	0	0	0.87	0.87	0	8.12

L = below limit of quantification. Q = not a quality assured parameter. T = trace.

ESTUARY DATA

SC-EWAW1	99/09/22	1225		94/00694
SC-EWAW2	99/09/22	1211		94/00693
SC-EWAW3	99/09/22	1155		94/00692
SC-EWAW4	99/09/22	1055		94/00691
SC-ESCR1	99/09/22	1231		94/00695
SC-ESCR2	99/09/22	1242		94/00696
SC-ESCR4	99/09/22	1254		94/00697
SC-ESCR6	99/09/22	1305		94/00698
SC-ESCR8	99/10/27	1030	199967977	94/01590
SC-ESCR9	99/09/22	1315		94/00699
	99/10/27	1040	199967976	94/01589

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-MON2	99/06/28	2032	199905181	94/00493	0	2.16	0	0.014	1.2	0.550	0
	99/07/19	1755	–	–							
	99/08/23	1325	199908985	94/00620	0	6.41	0	0.011	0.8	0.620	0.059
SC-MON1A	99/07/19	1744	199906674	94/00551	0	1.42	0	0.014	0.9	0.610	0
	99/08/23	1335	199908986	99/00607	0	6.90	0	0.012	1.0	0.690	0
	99/09/27	1150	199911158	94/00664	0	4.82	0	0.013	0.6	0.640	0
	99/10/17	1345	199912818	94/00665	0	3.99	0	0.008	0.7	0.500	0
SC-MON1	99/08/23	1735	199908987	99/00609	0	3.73	0	0.017	0.4	0.820	0
	99/09/27	1230	199911155	94/00663	0	2.98	0	0.010	0.3	0.720	0
	99/10/17	1220	199912817	94/00667	0	2.03	0	0.006	0.3	0.500	0
SC-HAY1	99/07/11	1719	199905987	94/00513	0	0.45	0	0.054	1.0	1.180	0
SC-NMILL1	99/07/11	1705	199905993	94/00519	0	2.20	0	0.030	7.1	0.620	0.0055
SC-EGTR1	99/07/11	1740	199905985	94/00510	0	3.47	0	0.023	1.0	0.590	0
	99/08/23	1855	199908988	94/00610	0	2.06	0	0.013	0.4	0.670	0
SC-FC1	99/06/25	1442	199905172	94/00487	0	3.22	0	0	0.2	0	0
	99/06/28	2114		94/00495							
	99/07/19	1602	199906673	94/00550	0	3.24	0	0.005	0.2	0	0
	99/08/05	1605	199907771	94/01373	0	3.15	0	0	0.4	0	0
	99/08/23	1930	199908989	94/00611	0	2.36	0	0	0.3	0	0
	99/09/09	2000	199909940	94/01530	0	3.49	0	0	0.1	0.200	0
	99/10/17	1425	199912819	94/00669	0	2.82	0	0	0.4	0	0
SC-MUD1	99/06/25	1415	199905171	94/00486	0	3.30	0	0	0.1	0.220	0.057
SC-SMED	99/06/25	1346	199905170	94/00485	0	4.11	0	0.022	0.6	0.440	0.069
	99/06/28	2133	199905184	94/00496							
SC-PIR1	99/09/27	1455	199911156	94/00666	0	3.03	0	0.017	0.5	0.680	0
SC-MUSQ1	99/08/29	1543	199909312	99/00608	0	2.46	0	0.005	0.1	0.220	0
SC-BOLT1	99/08/17	1605	199908558	94/00590	0	2.91	0	0.012	0.6	0.400	0
SC-EBRK 1	99/08/17	1520	199908556	94/00522	0	2.39	0	0.006	0.4	0.220	0

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-PAL1	99/06/28	2200	199905182	94/00494	0	1.92	0	0.010	0.3	0.430	0
	99/07/19	1901	199906675	94/00549	0	1.50	0	0.008	0.3	0.380	0
	99/08/23	2025	199908990	94/00612	0	2.60	0	0.012	0.3	0.480	0
	99/09/27	1830	199911157	94/00668	0	2.99	0	0.011	0.3	0.500	0
	99/10/17	1500	199912820	94/01670	0	3.15	0	0.010	0.6	0.480	0
SC-DEAD1	99/06/28	2220	199905185	94/00497	0	1.04	0	0.042	1.0	0.640	0
	99/07/19	1325	--	--							
SC-THIRD1	99/06/28	2240	199905186	94/00498	0	1.81	0	0.011	0.9	0.450	0.0075
	99/07/19	1923	199906676	94/00548	0	1.51	0	0.010	0.5	0.450	0.02
SC-WBEV1	99/07/11	2030	199905986	94/00512	0	1.46	0	0.016	0.5	0.830	0.0057
SC-MCAD1	99/07/11	2000	199905992	94/00520	0	0.76	0	0.018	0.2	0.900	0.0086
SC-DIGY1	99/06/28	2305	199905187	94/00499	0	2.90	0	0.009	0.7	0.330	0
	99/07/19	1940	199906677	94/00547	0	2.54		0.009	0.3	0.330	0.01
	99/08/05	1750	199907772	94/01374	0	2.42	0	0.006	0.5	0.340	0
	99/08/23	2045	199908991	94/00613	0	2.41	0	0.007	0.5	0.320	0
	99/09/08	1920	199909899	94/01529	0	2.86	0	0.013	0.5	0.400	0
	99/10/17	1520	199912821	94/01574	0	2.71	0	0.012	2.7	0.550	0
SC-RVB	99/06/23	1205	199904898	94/00431	0	2.85	0	0	0.4	0.270	0
	99/07/18	2055	199906588	94/00553	0	2.79	0	0	0.3	0.220	0.01
	99/08/05	1925	199907774	94/01376	0	3.08	0	0	0.3	0.240	0
	99/08/22	1825	199908893	94/00606	0	2.61	0	0	0.5	0.000	0
	99/09/08	1755	199909898	94/01528	0	3.27	0	0	0.4	0.240	0
	99/10/17	1535	199912822	94/01563	0	2.58	0	0	1.0	0.230	0
SC-RWING	99/06/23	1300	199904911	94/00449	0	2.78	0	0	0.4	0.300	0
	99/07/18	2027	199906587	94/00552	0	2.80	0	0	0.4	0.230	0.0075
	99/08/05	1820	199907773	94/01375	0	3.15	0	0	0.4	0.000	0
	99/08/22	1745	199908892	94/00605	0	3.11	0	0	0.4	0.000	0
	99/09/08	1640	199909897	94/01527	0	2.99	15	0	0.2	0.240	0
	99/10/17	1605	199912823	94/01564	0	2.72	0	0	0.9	0.230	0
SC-RBEAC	99/10/17	1705	199912824	94/01567	0	2.90	1600	0.006	1.2	0.300	0
SC-CAN2	99/06/23	1030	199904896	94/00429	0	1.57	0	0.016	1.4	0.570	0
	99/07/18	1750	199906596	94/00546	0	1.20	0	0.028	1.7	0.770	0.011
	99/08/05	2030	199907775	94/01377	0	1.33	0	0.031	1.7	0.780	0.012
	99/08/17	2110	199908559	94/00592	0	1.37	0	0.033	1.8	0.770	0
	99/09/26	1815	199910948	94/01561	0	8.15	0	0.018	0.8	0.730	0
	99/10/17	1735	199912825	94/01568	0	6.63	0	0.011	1.0	0.670	0

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-CAN1	99/08/17	2030	199908557	94/00559	0	1.45	0	0.026	1.6	0.660	0
SC-KING2	99/10/17	1750	199912826	94/01569	0	6.18	0	0.007	0.4	0.590	0
SC-RGLEAS	99/06/23	0950	199904895	94/00428	0	2.80	0	0	0.5	0.360	0
	99/07/18	1720	199906595	94/00545	0	2.69	0	0.005	0.5	0.320	0.0078
	99/08/22	1550	199908903	94/00603	0	2.78	0	0	0.4	0	0
	99/08/26	1729	199910947	94/01560	0	5.93	0	0.017	0.4	0.610	0.013
	99/10/18	1715	199912971	94/01570	0	3.47	0	0	0.4	0.370	0
SC-RWOOD	99/08/30	1105	199909407	94/00615	0	2.70	0	0	0.4	0.250	0
SC-RGRAS	99/07/07	1340	199905814	94/00503	0	3.29		0.009	0.6	0.360	0.0076
	99/08/30	1135	199909408	99/00616	0	2.66	0	0	0.3	0.260	0
SC-RBUTL	99/07/07	1430	199905813	94/00504	0	13.00	0	0.022	1.2	0.510	0.0087
	99/08/30	1220	199909409	94/00617	0	9.20	0	0.028	0.8	0.390	0
SC-RUPM	99/06/23	0910	199904894	94/00427	0	9.80	0	0.021	1.4	0.410	0
	99/07/18	1645	199906594	94/00544	0	13.10	0	0.033	0.9	0.480	0.016
	99/08/06	1630	199907776	94/01378	0	15.60	0	0.034	1.0	0.440	0.032
	99/08/30	1325	199909410	94/00618	0	14.70	0	0.032	0.8	0.380	0
	99/09/15	1050	199910264	94/01547	0	9.17	0	0.026	1.0	0.320	0
	99/10/18	1635	199912969	94/01587	0	5.92	0	0.010	1.4	0.330	0
SC-MOH1	99/06/23	0850	199904893	94/00426	0	2.39	0	0.018	1.5	0.560	0
	99/07/18	1630	199906593	94/00543	0	2.88	0	0.013	1.1	0.470	0.041
	99/08/06	1705	199907777	94/01379	0	3.76	0	0.015	0.8	0.400	0
	99/08/22	1500	199908901	94/00601	0	3.10	0	0.013	0.7	0.500	0.02
	99/08/26	1645	199910945	94/00483	0	8.95	0	0.022	1.0	0.990	0.0078
	99/10/18	1645	199912970	94/01571	0	4.60	0	0.013	1.4	0.690	0
SC-MOH2	99/08/22	1520	199908902	94/00602	0	2.49	0	0.014	0.9	0.380	0.00
SC-MOH3	99/08/26	1700	199910944	94/00482	0	8.83	0	0.022	1.2	0.910	0.014
SC-DOOD2	99/07/07	1700	199905815	94/00502	0	6.28	0	0.024	3.8	0.410	0.0089
SC-RMTB	99/06/23	830	199904892	94/00425	0	14.80	0	0.037	1.9	0.480	0.024
	99/07/18	1620	199906592	94/00554	0	15.40	0	0.030	1.1	0.440	0.012
	99/08/06	1730	199907778	94/01380	0	18.10	0	0.040	0.9	0.420	0.0068
	99/08/22	1445	199908900	94/00600	0	10.50	0	0.028	2.4	0.320	0
	99/09/08	1010	199909896	94/01526	0	20.80	0	0.039	1.0	0.390	0
	99/10/18	1558	199912968	94/01572	0	7.40	0	0.018	2.1	0.410	0

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
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Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-TAN1	99/07/07	1723	199905817	94/00506							
	99/10/18	1545	199912972	94/01581	0	10.40	50	0.150	19.7	3.100	0.016
SC-TAN2	99/07/07	1710	199905816	94/00505							
	99/10/18	1535	199912967	94/00677	0	10.00	30	0.028	14.3	2.400	0.01
SC-DEN1	99/06/23	0805	199904891	94/00424	0	3.21	0	0.010	1.0	0.420	0
	99/07/18	1555	199906591	94/00521	0	3.98	0	0.012	1.1	0.340	0.0068
	99/08/06	1850	199907779	94/01381	0	4.40	0	0.009	0.8	0.340	0
	99/08/22	1430	199908899	94/00599	0	3.08	0	0.013	0.9	0.260	0
	99/09/08	0920	199909895	94/01525	0	2.57	0	0.008	0.8	0.320	0
	99/10/18	1330	199912965	94/01579	0	5.76	50	0.019	38.7	0.460	0
SC-DEN2	99/08/22	1645	199908894	94/00591	0	2.92	0	0.006	0.3	0.000	0
	99/10/19	1355	199913057	94/01588							
SC-DEN2A	99/10/19	1340	199913055	94/01586							
	99/10/19	1340	199913062	94/01586							
SC-DEN2B	99/10/19	1330	199913057	94/01585							
SC-DEN5	99/06/23	1115	199904897	94/00430	0	1.63	0	0.010	0.4	0.610	0
	99/08/22	1625	199908904	94/00604	0	1.89	0	0.008	0.2	0.460	0
	99/09/27	1920	199911154	94/01562	0	6.09	0	0.018	0.8	0.900	0.0077
SC-BILL1	99/08/23	1415	199908981	94/00675	0	10.20	15	0.240	4.6	1.750	0.011
	99/09/15	1125	199910261	94/00478	0	17.20	0	0.088	4.8	1.410	0.0099
	99/10/19	1420	199913052	94/01580			0				
	99/10/19	1420	199913059	94/01580							
SC-BILL1A	99/09/15	1140	199910262	94/00479	0	25.00	15	0.055	6.0	0.940	0.0073
	99/10/19	1405	199913056	94/01582							
SC-BILL1B	99/10/19	1410	199913053	94/01583							
	99/10/19	1410	199913060	94/01583							
SC-BILL1C	99/10/19	1415	199913054	94/01584							
	99/10/19	1415	199913061	94/01584							
SC-BILL2	99/08/23	1340	199908980	94/00676	0	5.30	0	0.015	1.4	0.440	0

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-MEAD1	99/08/23	1750	199908983	94/00678	0	5.75	0	0.013	1.4	0.400	0.0071
	99/10/18	1300	199912966	94/01680	0	8.17	0	0.017	4.6	0.380	0
SC-MEAD4	99/08/23	1430	199908982	94/00679	0	11.70	0	0.021	4.1	0.250	0
SC-HAT2	99/08/23	1445	199908984	94/00681	0	13.40	0	0.015	1.5	0.000	0
SC-BENS1	99/06/29	0725	199905189	94/00501	0	8.48	0	0.032	5.8	0.530	0
	99/09/26	1510	199910943	94/00480	0	12.70	0	0.020	3.7	0.380	0.022
SC-PARK1	99/10/18	750	199912829	94/01573	0	13.10	30	0.018	8.3	0.470	0.01
SC-GALL1	99/06/23	0735	199904890	99/00423	0	4.86	0	0.009	0.9	0.260	0
	99/07/18	1520	199906590	94/00514	0	4.83	0	0.010	2.0	0.260	0
	99/08/06	1930	199907780	94/01382	0	3.54	0	0.012	0.9	0.400	0
	99/08/22	1405	199908898	94/00598	0	4.24	0	0.012	1.5	0.310	0
	99/09/07	1940	199909894	94/01524	1.68	14.10	0	0.007	1.2	0.460	0
	99/10/18	1240	199912964	94/01576	0	13.20	0	0.013	4.9	0.400	0.0072
SC-COTT2	99/07/07	1900	199905818	94/00507	0	2.46	0	0.023	5.0	0.810	0.006
SC-WAW1	99/06/23	0625	199904887	94/00420	0	3.23	0	0.014	0.3	0.440	0
	99/07/18	1500	199906589	94/00511	0	3.38	0	0.017	0.5	0.400	0
	99/08/06	1950	199907781	94/01383	0	4.07	0	0.018	0.4	0.440	0
	99/08/22	1350	199908895	94/00595	0	3.30	0	0.022	0.3	0.400	0
	99/09/07	1830	199909893	94/01523	0	4.36	0	0.030	0.5	0.570	0
	99/10/18	1155	199912961	94/01575	0	4.74	0	0.011	2.3	0.360	0
SC-WAW3	99/06/23	0710	199904888	94/00421	0	2.03	0	0.021	0.8	0.470	0
	99/08/22	1330	199908896	94/00596	0	3.22	0	0.000	0.4	0.210	0
	99/10/18	1215	199912962	94/01576	0	4.70	0	0.008	0.3	0.300	0
SC-POUT2	99/06/23	0655	199904889	94/00422	0	3.06	0	0.011	0.5	0.270	0
	99/08/22	1325	199908897	94/00597	0	2.31	0	0.021	1.2	0.380	0
	99/10/18	1225	199912963	94/01577	0	3.84	0	0.013	0.7	0.460	0
SC-GOLD1	99/07/07	1945	199905820	94/00509	0	1.96	0	0.007	0.6	0.370	0.0052
	99/08/29	1905	199909313	94/00690	0	1.56	0	0	0.4	0.290	0.0056
SC-GOLD2	99/07/07	1915	199905819	94/00508	0	2.16	0	0.006	0.3	0.350	0
SC-GRLAW	99/08/29	1920	199909314	99/00672	0	1.60	0	0.010	1.6	0.500	0

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	SB ug/l as Sb	SO4 mg/l as SO4	TSS mg/l as residue	TP-L mg/l as P	Turb as NTU	TKN mg/l as N	ZN mg/l as Zn
SC-JOHN1	99/09/28	1435	199910946	94/00484	0	5.84	0	0.017	5.6	0.430	0
SC-POT1	99/06/29	0655	199905188	94/00500	0	4.42	80	0.046	62.5	0.280	0
	99/08/24	0725	199908992	94/00614	0	5.45	0	0.031	10.8	0.380	0
	99/09/26	1355	199910941	94/00700	0	12.20	0	0.106	18.0	0.800	0.013
	99/10/17	1905	199912827	94/01565	0	6.32	0	0.022	6.5	0.270	0
SC-POT2	99/08/24	0725	--	--							
	99/09/26	1401	199910942	94/00481	0	46.30	0	0.045	3.1	0.450	0.0064
	99/10/17	1910	199912828	94/01566	0	9.42	0	0.014	0.2	0.270	0.0077

ESTUARY DATA

SC-EWAW1	99/09/22	1225		94/00694
SC-EWAW2	99/09/22	1211		94/00693
SC-EWAW3	99/09/22	1155		94/00692
SC-EWAW4	99/09/22	1055		94/00691
SC-ESCR1	99/09/22	1231		94/00695
SC-ESCR2	99/09/22	1242		94/00696
SC-ESCR4	99/09/22	1254		94/00697
SC-ESCR6	99/09/22	1305		94/00698
SC-ESCR8	99/10/27	1030	199967977	94/01590
SC-ESCR9	99/09/22	1315		94/00699
	99/10/27	1040	199967976	94/01589

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data				
					Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-MON2	99/06/28	2032	199905181	94/00493	Slight Cloud	Low	26.0	6.9	Drought conditions. After rain shower
	99/07/19	1755	--	--	Cloud/Sun	Low	25.7	7.1	Drought conditions.
	99/08/23	1325	199908985	94/00620	Sunny	Low	22.4	6.9	
SC-MON1A	99/07/19	1744	199906674	94/00551	Cloud/Sun	Low	25.2	6.9	Drought conditions. Compare MON1 (T 25.7, DO 7.1), MON mouth (
	99/08/23	1335	199908986	99/00607	Sunny	Low	24.1	6.0	Drought conditions. Air T 30C
	99/09/27	1150	199911158	94/00664	Fog/Cloud	Medium	14.0	8.2	
	99/10/17	1345	199912818	94/00665	Light rain	Med-High	7.9	10.9	
SC-MON1	99/08/23	1735	199908987	99/00609	Sunny	Low	20.1	5.0	Drought conditions.
	99/09/27	1230	199911155	94/00663	Sunny	Medium	11.1	5.3	
	99/10/17	1220	199912817	94/00667	Overcast	Medium	7.8	8.0	
SC-HAY1	99/07/11	1719	199905987	94/00513	Sunny	Low	19.9	6.5	34mm rain in last 36hrs (Canterbury DNR gauge)
SC-NMILL1	99/07/11	1705	199905993	94/00519	0	Low	16.5	8.9	34mm rain in last 36hrs (Canterbury DNR gauge)
SC-EGTR1	99/07/11	1740	199905985	94/00510	Sunny	Low	18.9	7.8	34mm rain in last 36hrs (Canterbury DNR gauge)
	99/08/23	1855	199908988	94/00610	Sunny	Low	25.5	6.9	Drought conditions.
SC-FC1	99/06/25	1442	199905172	94/00487	Sunny	Low	24.0	9.0	Drought conditions.
	99/06/28	2114		94/00495	Slight Cloud	Low	24.5	8.0	Drought conditions. For e. coli only
	99/07/19	1602	199906673	94/00550	Cloud/Sun	Low	25.0	8.0	Drought conditions.
	99/08/05	1605	199907771	94/01373	Cloudy	Low	23.5	8.0	Drought conditions. Rock baskets installed. *B taken only
	99/08/23	1930	199908989	94/00611	Sunny	Low	23.4	7.6	
	99/09/09	2000	199909940	94/01530	Sunny	Low			Rock baskets retrieved.
	99/10/17	1425	199912819	94/00669	Overcast	Medium	11.7	12.6	
SC-MUD1	99/06/25	1415	199905171	94/00486	Sunny	Low	26.0	8.4	*B taken, only
SC-SMED	99/06/25	1346	199905170	94/00485	Sunny	Low	24.0	9.2	Drought conditions.
	99/06/28	2133	199905184	94/00496	Showers	Low	26.0	4.9	Drought conditions. Showers during the day. For e. coli only
SC-PIR1	99/09/27	1455	199911156	94/00666	Sunny	Medium	13.7	9.8	
SC-MUSQ1	99/08/29	1543	199909312	99/00608	Sunny	Low	20.3	6.9	Drought conditions. Trickling flow only.
SC-BOLT1	99/08/17	1605	199908558	94/00590	Hi Overcast	Low	24.1	7.4	Drought conditions.
SC-EBRK 1	99/08/17	1520	199908556	94/00522	Sun/Cloud	Low	19.9	6.4	Drought conditions.

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data				
					Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-PAL1	99/06/28	2200	199905182	94/00494	Slight cloud	Low	23.5	7.2	Drought conditions.
	99/07/19	1901	199906675	94/00549	Cloud/Sun	Low	22.9	8.4	Drought conditions.
	99/08/23	2025	199908990	94/00612	Sunny	Low	21.1	7.4	Drought conditions.
	99/09/27	1630	199911157	94/00668	Sunny	Medium	14.6	9.9	
	99/10/17	1500	199912820	94/01670	Overcast	Medium	8.6	12.6	
SC-DEAD1	99/06/28	2220	199905185	94/00497	Cloudy, dark	Low	24.0	3.6	Beaver dam immed above,marsh above
	99/07/19	1325	--	--	Sunny	Low	23.9	3.2	Drought conditions. Scum above beaver dam upstream
SC-THIRD1	99/06/28	2240	199905186	94/00498	Dark	Low	25.0	6.5	Drought conditions. Showers during day
	99/07/19	1923	199906676	94/00548	Sunny	Low	25.0	6.3	
SC-WBEV1	99/07/11	2030	199905986	94/00512	Sunny	Low	19.2	6.6	34mm rain in last 39hrs (Canterbury DNR gauge)
SC-MCAD1	99/07/11	2000	199905992	94/00520	Sunny	Low	19.9	6.5	34mm rain in last 39hrs (Canterbury DNR gauge)
SC-DIGY1	99/06/28	2305	199905187	94/00499	Showers	Low	25.2	5.9	Drought conditions.
	99/07/19	1940	199906677	94/00547	Sunny	Low	24.8	7.6	Drought conditions.
	99/08/05	1750	199907772	94/01374	Cloudy	Low	24.2	8.8	Drought conditions. Rock baskets installed. *B only
	99/08/23	2045	199908991	94/00613	Sunny	Low	23.3	7.0	Drought conditions.
	99/09/08	1920	199909899	94/01529	Cloud/Sun	Low	23.6	8.0	Rock baskets retrieved - 3 bags out
	99/10/17	1520	199912821	94/01574	Overcast	Medium	10.0	13.3	
SC-RVB	99/06/23	1205	199904898	94/00431	Sunny	Low	23.0	7.7	Flow 319 cfs @ Vanceboro dam
	99/07/18	2055	199906588	94/00553	Sunny	Low	26.8	11.1	Flow 450 cfs @ Vanceboro dam
	99/08/05	1925	199907774	94/01376	Cloudy	Low	23.5	8.1	Rock baskets installed. Flow 623 cfs @ Vanceboro dam. *B taken or
	99/08/22	1825	199908893	94/00606	Sunny	Med-High	21.5	9.2	Flow 1260 cfs @ VB dam (high for this time of year)
	99/09/08	1755	199909898	94/01528	Sunny	Low	21.8	8.1	Rock baskets retrieved. Flow 660 cfs @ Vanceboro dam
	99/10/17	1535	199912822	94/01563	Overcast	Medium	10.2	13.2	Flow 986cfs @ Vanceboro dam
SC-RWING	99/06/23	1300	199904911	94/00449	Sunny	Low	25.0	7.5	Flow 319 cfs @ Vanceboro dam
	99/07/18	2027	199906587	94/00552	Sunny	Low	27.1	6.6	Air T 29C. Flow 450 cfs @ Vanceboro dam
	99/08/05	1820	199907773	94/01375	Sunny	Low	23.5	8.2	Rock baskets installed. Flow 623 cfs @ Vanceboro dam. *B taken or
	99/08/22	1745	199908892	94/00605	Sunny	Med-High	22.0	8.3	Flow 1260 cfs @ VB dam (high for this time of year)
	99/09/08	1640	199909897	94/01527	Sunny	Low	22.0	7.9	Rock baskets retrieved. Flow 660 cfs @ Vanceboro dam
	99/10/17	1605	199912823	94/01564	Hi overcast	Medium	10.4	13.4	Flow 986cfs @ Vanceboro dam
SC-RBEAC	99/10/17	1705	199912824	94/01567	Cloud/Sun	Medium	10.7	11.7	Flow 986cfs @ Vanceboro dam
SC-CAN2	99/06/23	1030	199904896	94/00429	Sunny	Low	22.5	7.7	Drought conditions.
	99/07/18	1750	199906596	94/00546	Sunny	Low	29.9	7.1	Drought conditions.
	99/08/05	2030	199907775	94/01377	Clear	Low	24.0	8.0	Drought conditions. Rock baskets installed. *B taken only
	99/08/17	2110	199908559	94/00592	Dark	Low	24.4	6.7	Drought conditions.
	99/09/26	1815	199910948	94/01561	Cloudy	Medium	15.6	9.3	63.3mm rain in last 96 hrs.
	99/10/17	1735	199912825	94/01568	Hi overcast	Medium	11.5	11.3	

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data				
					Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-CAN1	99/08/17	2030	199908557	94/00559	Clearing/Dusk	Low	25.9	7.0	Drought conditions.
SC-KING2	99/10/17	1750	199912828	94/01569	Hi overcast	Medium	11.0	10.5	
SC-RGLEAS	99/06/23	0950	199904895	94/00428	Sunny	Low	23.0	7.3	
	99/07/18	1720	199906595	94/00545	Sunny	Low	29.9	7.5	
	99/08/22	1550	199908903	94/00603	Overcast	Low	21.3	8.2	
	99/09/26	1729	199910947	94/01560	Cloudy	Med-High	16.9	9.2	63.3mm rain in last 96 hrs.
	99/10/18	1715	199912971	94/01570	Light rain	Med-High	9.6	11.3	
SC-RWOOD	99/08/30	1105	199909407	94/00615	Sunny	Low	23.0	6.8	Flow 875 cfs @ Woodland gauge
SC-RGRAS	99/07/07	1340	199905814	94/00503	Sunny	Low	25.2	7.2	Flow 835 cfs @ Baring gauge
	99/08/30	1135	199909408	99/00616	Sunny	Low	23.1	7.2	Flow 875 cfs @ Woodland gauge
SC-RBUTL	99/07/07	1430	199905813	94/00504	Sunny	Low	26.5	7.4	Flow 835 cfs @ Baring gauge
	99/08/30	1220	199909409	94/00617	Sunny	Low	23.0	7.4	Flow 875 cfs @ Woodland gauge
SC-RUPM	99/06/23	0910	199904894	94/00427	Sunny	Low	21.5	6.9	Flow 982 cfs @ Baring gauge
	99/07/18	1645	199906594	94/00544	Sunny	Low	28.0	7.4	Flow 840cfs @ Baring gauge
	99/08/06	1630	199907776	94/01378	Sunny	Low	26.0	8.0	Rock baskets installed. Flow 834 cfs @ Woodland gauge. *B taken o
	99/08/30	1325	199909410	94/00618	Sunny	Low	22.3	7.5	Flow 875 cfs @ Woodland gauge
	99/09/15	1050	199910264	94/01547	Sunny	Medium			Flow 1050-1250cfs @ Woodland gauge
	99/10/18	1635	199912969	94/01587	Overcast	Med-High	10.3	11.6	Flow 2130 cfs @ Woodland gauge
SC-MOH1	99/06/23	0850	199904893	94/00426	Sunny	Low	19.5	7.9	Drought conditions.
	99/07/18	1630	199906593	94/00543	Sunny	Low	31.5	7.6	Drought conditions.
	99/08/06	1705	199907777	94/01379	Sunny	Low	26.0	8.3	Drought conditions. Rock baskets installed. *B taken only.
	99/08/22	1500	199908901	94/00601	Overcast	Low	20.7	9.0	Drought conditions.
	99/09/26	1645	199910945	94/00483	Cloudy	High	15.1	8.8	63.3mm rain in last 96 hrs. Water tea-colored, level falling
	99/10/18	1645	199912970	94/01571	Overcast	Med-High	9.8	11.3	
SC-MOH2	99/08/22	1520	199908902	94/00602	Cloud/Sun	Low	22.2	8.4	Drought conditions.
SC-MOH3	99/09/26	1700	199910944	94/00482	Cloudy	Med-High	14.7	8.2	63.3mm rain in last 96 hrs. Water tea-colored, level falling rapidly
SC-DOOD2	99/07/07	1700	199905815	94/00502	Sunny	Low	25.7	6.9	
SC-RMTB	99/06/23	830	199904892	94/00425	Sunny	Low	23.5	7.1	Flow 982 cfs @ Baring gauge
	99/07/18	1620	199906592	94/00554	Sunny	Low	28.9	8.3	Flow 840 cfs @ Baring gauge
	99/08/06	1730	199907778	94/01380	Sunny	Low	25.0	8.5	Rock baskets installed. Flow 834 cfs @ Woodland gauge. *B taken o
	99/08/22	1445	199908900	94/00600	Overcast	Low	21.7	7.0	Flow 1892 cfs @ Woodland gauge
	99/09/08	1010	199909896	94/01526	Cloudy	Low	22.8	7.4	Rock baskets retrieved. Flow 1141 cfs @ Woodland gauge
	99/10/18	1558	199912968	94/01572	Overcast	Med-High	10.3	10.6	Flow 2130cfs @ Woodland gauge

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data				
					Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-TAN1	99/07/07	1723	199905817	94/00506	Sunny	Low	22.7	5.6	Drought conditions. Receives some flow from Flakeboard
	99/10/18	1545	199912972	94/01581	Overcast	Medium	10.8	11.8	Sewer overflow/bypass active due to recent rain.
SC-TAN2	99/07/07	1710	199905816	94/00505	Sunny	Low	24.3	5.9	Drought conditions. Flow from Flakeboard and Milltown STP
	99/10/18	1535	199912967	94/00677	Overcast	Medium	10.3	12.0	Some silt in water. Flow from Flakeboard and Milltown STP (bypassir
SC-DEN1	99/06/23	0805	199904891	94/00424	Sunny	Low	20.0	8.1	Drought conditions.
	99/07/18	1555	199906591	94/00521	Sunny	Low	29.9	7.1	Drought conditions.
	99/08/06	1850	199907779	94/01381	Sunny	Low	25.0	7.8	Drought conditions. Rock baskets installed. *B taken only
	99/08/22	1430	199908899	94/00599	Overcast	Low	21.5	8.3	Drought conditions.
	99/09/08	0920	199908895	94/01525	Rain	Low	21.7	8.0	Rock baskets retrieved
	99/10/18	1330	199912965	94/01579	Raining/Cold	High	10.2	11.5	Water very turbid. Suspect silt from highway construction is entering
SC-DEN2	99/08/22	1645	199908894	94/00591	Overcast	Low	21.2	8.6	Drought conditions.
	99/10/19	1355	199913057	94/01588	Sunny	Medium	7.6	12.6	one bacti taken only
SC-DEN2A	99/10/19	1340	199913055	94/01586	Sunny	Medium	7.4	12.5	two bacti taken only
	99/10/19	1340	199913062	94/01586	Sunny	Medium	7.4	12.5	Duplicate of lab sample 199913055 (same field #)
SC-DEN2B	99/10/19	1330	199913057	94/01585	Sunny	Medium	7.5	12.7	one bacti taken only
SC-DEN5	99/06/23	1115	199904897	94/00430	Sunny	Low	24.0	7.1	Drought conditions.
	99/08/22	1625	199908904	94/00604	Overcast	Low	23.1	7.6	Drought conditions.
	99/09/27	1920	199911154	94/01562	Sunny	Med-High	15.0	7.5	57.8mm rain 4-5 days previous
SC-BILL1	99/08/23	1415	199908981	94/00675	Sunny	Low	22.0	4.1	Drought conditions.
	99/09/15	1125	199910261	94/00478	Sunny	Low	18.0	7.0	Water somewhat murky, v. little flow
	99/10/19	1420	199913052	94/01580	Sunny	Medium	7.3	12.0	Two bacti taken here for >2000 dilution
	99/10/19	1420	199913059	94/01580	Sunny	Medium	7.3	12.0	Duplicate of lab sample 199913052 (same field #)
SC-BILL1A	99/09/15	1140	199910262	94/00479	Sunny	Low	20.0	4.8	Water somewhat murky, v little flow. Took extra bottle for e. coli diluti
	99/10/19	1405	199913056	94/01582	Sunny	Medium	7.4	12.3	1 bacti only
SC-BILL1B	99/10/19	1410	199913053	94/01583	Sunny	Medium	7.6	12.1	2 bacti taken only
	99/10/19	1410	199913060	94/01583	Sunny	Medium	7.6	12.1	Duplicate of lab sample 199913053 (same field #)
SC-BILL1C	99/10/19	1415	199913054	94/01584	Sunny	Medium	7.5	12.2	2 bacti taken only
	99/10/19	1415	199913061	94/01584	Sunny	Medium	7.5	12.2	Duplicate of lab sample 199913054 (same field #)
SC-BILL2	99/08/23	1340	199908980	94/00676	Sunny	Low	18.5	7.7	Drought conditions.

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data: Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-MEAD1	99/08/23	1750	199908983	94/00678	Sunny	Low	22.0	6.8	Drought conditions.
	99/10/18	1300	199912966	94/01680	Raining/Cold	High	9.1	8.8	
SC-MEAD4	99/08/23	1430	199908982	94/00679	Sunny	Low	18.0	9.1	Drought conditions.
SC-HAT2	99/08/23	1445	199908984	94/00681	Sunny	Low	18.5	9.0	Drought conditions.
SC-BENS1	99/06/29	0725	199905189	94/00501	Showers	Low	19.0	6.1	Drought conditions but some flow due to showers
	99/09/26	1510	199910943	94/00480	Cloudy	Medium	14.8	9.0	63.3mm rain in last 96 hrs.
SC-PARK1	99/10/18	750	199912829	94/01573					
SC-GALL1	99/06/23	0735	199904890	99/00423	Sunny	Low	15.0	9.2	Drought conditions.
	99/07/18	1520	199906590	94/00514	Sunny, hot	Low	25.4	8.3	Drought conditions.
	99/08/06	1930	199907780	94/01382	Sunny	Low	21.5	8.3	Drought conditions. Rock baskets installed.
	99/08/22	1405	199908898	94/00598	Overcast	Low	17.8	9.1	Drought conditions.
	99/09/07	1940	199909894	94/01524	Cloud/O'cast	Low			Rock baskets retrieved.
	99/10/18	1240	199912964	94/01578	Raining/Cold	High	9.7	11.9	
SC-COTT2	99/07/07	1900	199905818	94/00507	Sunny	Low	20.6	4.3	Drought conditions. Lily pads, small marsh immed above, impounded
SC-WAW1	99/06/23	0625	199904887	94/00420	Clear	Low	17.5	7.3	Drought conditions.
	99/07/18	1500	199906589	94/00511	Sunny, hot	Low	24.6	10.5	Drought conditions.
	99/08/06	1950	199907781	94/01383	Sunny	Low	26.0	8.5	Drought conditions. Rock baskets installed. *B taken only
	99/08/22	1350	199908895	94/00595	Hi overcast	Low	18.6	10.2	Drought conditions.
	99/09/07	1830	199909893	94/01523	Overcast	Low	24.0	9.9	Rock baskets retrieved - 3 bags out
	99/10/18	1155	199912961	94/01575	Raining/Cold	High	9.8	11.9	
SC-WAW3	99/06/23	0710	199904888	94/00421	Clear	Low	14.0	8.4	Drought conditions.
	99/08/22	1330	199908896	94/00596	Hi overcast	Low	18.9	9.2	Drought conditions.
	99/10/18	1215	199912962	94/01576	Raining/Cold	High	9.9	10.6	
SC-POUT2	99/06/23	0655	199904889	94/00422	Clear	Low	17.0	6.8	Drought conditions.
	99/08/22	1325	199908897	94/00597	Hi overcast	Low	17.5	9.4	Drought conditions.
	99/10/18	1225	199912963	94/01577	Raining/Cold	High	9.2	11.2	
SC-GOLD1	99/07/07	1945	199905820	94/00509	Sunny	Low	24.3	7.5	Drought conditions.
	99/08/29	1905	199909313	94/00690	Sunny	Low	21.8	7.2	Drought conditions.
SC-GOLD2	99/07/07	1915	199905819	94/00508	Sunny	Low	23.9	6.1	Drought conditions.
SC-GRLAW	99/08/29	1920	199909314	99/00672	Sunny	Low	18.9	7.2	Drought conditions. Summer flow, sill to Chamcook Lk changed?

APPENDIX 5a (cont.). 1999 St. Croix Stream Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time ADT	DOE Lab #	DOE Field #	Field Data: Weather	Water Level	Water temp (C)	DO (mg/l)	Observations
SC-JOHN1	99/09/26	1435	199910946	94/00484	Cloudy	Medium	13.0	10.9	63.3mm rain in last 96 hrs.
SC-POT1	99/06/29	0655	199905188	94/00500	Showers	Low	12.0		High silt load. Stream dry above water trap upstream. Nearby POT2
	99/08/24	0725	199908992	94/00614	Sunny	Medium	16.0	8.9	Silty. Compare to same time POT2 field readings.
	99/09/26	1355	199910941	94/00700	Cloudy	Medium	16.1	9.9	63.3mm rain last 96 hrs. Some cloudiness to water. Lower flow abov
	99/10/17	1905	199912827	94/01565	Sunny	High	11.7	11.5	
SC-POT2	99/08/24	0725	--	--	Sunny	Medium	12.2	9.1	Water clear (compare to POT1).
	99/09/26	1401	199910942	94/00481	Cloudy	Medium	14.2	10.0	63.3mm rain in last 96 hrs.
	99/10/17	1910	199912828	94/01566	Sunny	High	12.2	10.0	
ESTUARY DATA									
SC-EWAW1	99/09/22	1225		94/00694	Showers/wind	H.Tide-1028	15.0	7.6	Salinity 30.3 ppt
SC-EWAW2	99/09/22	1211		94/00693	Showers/wind	H.Tide-1028	15.5	7.3	Salinity 29.1 ppt
SC-EWAW3	99/09/22	1155		94/00692	Showers/wind	H.Tide-1028	15.6	7.4	Salinity 26.7 ppt
SC-EWAW4	99/09/22	1055		94/00691	Showers/wind	H.Tide-1028	15.8	7.5	Salinity 22.7 ppt
SC-ESCR1	99/09/22	1231		94/00695	Showers/wind	H.Tide-1028	16.0	8.1	Flow 2580cfs @ Woodland gauge. Salinity 23.2 ppt
SC-ESCR2	99/09/22	1242		94/00696	Showers/wind	H.Tide-1028	16.4	7.8	Flow 2580cfs @ Woodland gauge. Salinity 19.5 ppt
SC-ESCR4	99/09/22	1254		94/00697	Showers/wind	H.Tide-1028	16.0	8.1	Flow 2580cfs @ Woodland gauge. Salinity 6.10 ppt
SC-ESCR6	99/09/22	1305		94/00698	Showers/wind	H.Tide-1028	18.1	8.4	Flow 2580cfs @ Woodland gauge. Salinity 5.50 ppt
SC-ESCR8	99/10/27	1030	199967977	94/01590	Sunny	L.Tide 0830	8.7	--	Flow 2020cfs @ Woodland gauge. Salinity 0.2 ppt. Brown scum eddy
SC-ESCR9	99/09/22	1315		94/00699	Showers/wind	H.Tide-1028	18.5	8.8	Flow 2580cfs @ Woodland gauge. Salinity 0.3 ppt
	99/10/27	1040	199967976	94/01589	Sunny	L.Tide 0830	8.4	--	Flow 2020cfs @ Woodland gauge. Salinity 0.1 ppt

Appendix 5b. 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl "A" ug/l as Chl A	Cl mg/l as Cl-	Color as color units	Cond usie/cm	TOC mg/l as C
SCR-CNOS 1	Canoose Flowage - Station #1	98.07.08	0909	98-05424	94-98-00299	0.2	13.9	5.4	Q 5.3	2.19	70	43.4	16.2
		98.07.08	0916	98-05425	94-98-00300	1.0	13.7	5.3		2.19	80	43.3	16.3
		98.07.08	0920	98-05426	94-98-00301	1.65			Q 6.4				
		98.08.04	0919	98-06894	94-98-00323	0.2	12.9	5.9	Q 5.9	2.25	75	43.5	15.1
		98.08.04	0925	98-06895	94-98-00323	0.75	12.9	5.9		2.23	75	43.3	15.7
		98.09.13	1120	98-09251	94-98-00401	0.2	12.4	4.9	Q 15.0	2.36	70	43.2	15.0
		98.09.13	1120	98-09252	94-98-00401	0.2	12.7	5.0	Q 12.0	2.31	75	42.8	15.2
SCR-EGR 1	East Grand Lake - Station #1 (deep hole nr Greenland Pt)	98.07.06	0940	98-05172	94-98-00260	0.2	10.3	3.8	Q 1.8	1.48	0	34.0	4.8
		98.07.06	0952	98-05173	94-98-00261	6.6			Q 1.1				
		98.07.06	1010	98-05174	94-98-00262	13.5	10.0	4.0		1.52	5	34.4	4.2
		98.07.06	1020	98-05175	94-98-00263	26.5	10.1	4.0		1.49	0	34.8	4.3
		98.08.05	0948	98-07051	94-98-00345	0.2	10.5	4.4	Q 1.6	1.50	5	38.5	4.5
		98.08.05	0952	98-07052	94-98-00346	9.0			Q 1.1				
		98.08.05	0957	98-07053	94-98-00347	11.0	10.7	4.3		1.49	5	37.1	4.4
		98.08.05	1001	98-07054	94-98-00348	21.5	10.7	4.1		1.48	5	35.9	4.3
		98.08.30	1203	98-08574	94-98-00374	0.2	10.6	4.2	Q 2.5	1.50	0	38.0	3.8
		98.08.30	1207	98-08575	94-98-00375	8.6			Q 3.4				
		98.08.30	1211	98-08576	94-98-00376	13.0	10.7	4.2		1.48	0	37.5	3.7
		98.08.30	1214	98-08577	94-98-00377	25.0	10.5	4.1		1.53	0	38.0	3.4
SCR-EGR 4	East Grand Lake - Station #4 (deep hole nr The Tongue)	98.07.06	1122	98-05176	94-98-00264	0.2	10.0	3.9	Q 1.1	1.46	5	33.7	4.5
		98.07.06	1130	98-05177	94-98-00265	7.0			Q 1.4				
		98.07.06	1139	98-05178	94-98-00266	9.0	10.1	3.9		1.47	0	33.9	4.5
		98.07.06	1149	98-05179	94-98-00267	17.0	10.2	4.1		1.49	5	34.3	4.2
		98.08.05	1100	98-07055	94-98-00350	0.2	10.5	4.2	Q 1.2	1.50	5	35.4	4.9
		98.08.05	1110	98-07056	94-98-00351	6.5	10.4	4.0		1.49	5	35.9	4.5
		98.08.05	1114	98-07057	94-98-00352	9.0			Q 1.3				
		98.08.05	1119	98-07058	94-98-00353	12.0	10.4	4.4		1.48	0	36.5	4.2
		98.08.30	1318	98-08578	94-98-00378	0.2	10.5	4.3	Q 2.4	1.52	0	37.7	3.9
		98.08.30	1321	98-08579	94-98-00379	8.6	10.5	4.0		1.46	0	37.5	3.8
		98.08.30	1324	98-08580	94-98-00380	13.0			Q 2.1				
		98.08.30	1328	98-08581	94-98-00381	25.0	10.8	4.2		1.51	0	37.6	3.8
SCR-EGR 6	East Grand Lake - Station #6 (deep hole nr Caribou Pt)	98.07.06	1655	98-05184	94-98-00272	0.2	11.0	4.0	Q 2.1	1.44	5	35.1	5.4
		98.07.06	1700	98-05185	94-98-00273	6.0			Q 1.6				
		98.07.06	1706	98-05186	94-98-00274	6.5	10.3	3.9		1.44	5	34.7	4.6
		98.07.06	1712	98-05187	94-98-00275	12.0	10.3	3.9		1.46	5	34.4	4.6
		98.08.04	1447	98-06904	94-98-00333	0.2	11.3	4.5	Q 1.7	1.49	5	36.0	5.4
		98.08.04	1453	98-06905	94-98-00334	3.7	11.3	4.5		1.48	5	37.8	4.9
		98.08.04	1456	98-06906	94-98-00335	5.6			Q 2.1				
		98.08.04	1501	98-06907	94-98-00336	6.5	10.7	4.2		1.50	5	36.9	4.4

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl "A" ug/l as Chl A	Cl mg/l as Cl-	Color as color units	Cond usie/cm	TOC mg/l as C
SCR-EGR 6	East Grand Lake - Station #6	98.09.03	1125	98-08916	94-98-00390	0.2	11.2	4.4	Q 2.9	1.59	10	38.3	4.6
		98.09.03	1130	98-08917	94-98-00391	3.6	11.1	4.4		1.58	10	37.6	4.5
		98.09.03	1134	98-08918	94-98-00392	6.2	11.3	4.4		1.67	10	37.8	4.8
		98.09.03	1136	98-08919	94-98-00393	7.0			Q 2.2				
SCR-NTH 1	North Lake - Station #1 (deep hole, east end)	98.07.06	1804	98-05191	94-98-00279	0.2	13.2	4.6	Q 3.2	1.04	30	37.0	9.7
		98.07.06	1812	98-05192	94-98-00280	2.7			Q 2.7				
		98.07.06	1815	98-05193	94-98-00281	2.2	13.8	5.2		1.14	30	38.6	8.8
		98.07.06	1819	98-05194	94-98-00282	3.5	13.8	5.2		1.14	40	39.0	8.5
		98.08.04	1608	98-06912	94-98-00341	0.2	15.2	6.0	Q 2.5	1.23	30	44.8	9.0
		98.08.04	1612	98-06913	94-98-00342	2.0	15.3	6.1		1.22	40	44.7	9.5
		98.08.04	1615	98-06914	94-98-00343	2.6			Q 3.6				
		98.08.04	1618	98-06915	94-98-00344	3.0	15.3	6.0		1.24	30	44.7	9.0
		98.09.03	1232	98-08924	94-98-00398	0.2	16.4	6.3	Q 5.1	1.34	40	46.9	9.4
		98.09.03	1238	98-08925	94-98-00399	2.0	16.3	6.3		1.30	40	47.1	9.2
		98.09.03	1242	98-08926	94-98-00400	2.9	16.4	6.3	Q 5.3	1.29	30	46.9	9.3
SCR-NTH 2	North Lake - Station #2 (deep hole, west end)	98.07.06	1730	98-05188	94-98-00276	0.2	16.1	6.0	Q 3.2	1.24	40	43.4	9.5
		98.07.06	1745	98-05189	94-98-00277	3.2	14.5	5.4	Q 2.6	1.18	40	40.5	8.6
		98.07.06	1749	98-05190	94-98-00278	5.0	14.2	5.2		1.18	30	40.0	8.5
		98.08.04	1541	98-06908	94-98-00337	0.2	16	6.1	Q 2.2	1.26	30	45.7	8.8
		98.08.04	1544	98-06909	94-98-00338	2.5	16.2	6.2		1.26	30	46.0	9.0
		98.08.04	1447	98-06910	94-98-00339	3.6			Q 2.5				
		98.08.04	1550	98-06911	94-98-00340	4.0	16.1	6.2		1.27	30	46.1	8.8
		98.09.03	1211	98-08920	94-98-00394	0.2	16.8	6.7	Q 6.5	1.34	40	47.9	9.2
		98.09.03	1214	98-08921	94-98-00395	2.5	16.7	6.5		1.36	40	48.0	9.0
		98.09.03	1216	98-08922	94-98-00396	3.8			Q 4.4				
		98.09.03	1219	98-08923	94-98-00397	4.0	16.7	6.5		1.35	40	47.9	9.0
SCR-SKIF 1	Skiff Lake - Station #1	98.07.07	1423	98-05328	94-98-00295	0.2	8.56	3.4	Q 0.2	1.78	0	32.5	3.6
		98.07.07	1437	98-05329	94-98-00296	6.0	8.67	3.4		1.72	5	31.0	3.8
		98.07.07	1440	98-05330	94-98-00297	7.8			Q 2.2				
		98.07.07	1450	98-05331	94-98-00298	10.5	8.91	3.4		1.75	5	31.2	3.4
		98.08.05	1502	98-07063	94-98-00357	0.2	9.02	3.6	Q 1.0	1.78	0	33.2	3.2
		98.08.05	1505	98-07064	94-98-00358	0.2	8.96	3.4	Q 0.9	1.78	0	33.1	3.2
		98.08.05	1510	98-07065	94-98-00359	6.2	8.97	3.6		1.75	0	33.2	3.2
		98.08.05	1515	98-07066	94-98-00360	7.5			Q 2.0				
		98.08.05	1526	98-07067	94-98-00361	10.5	9.19	3.6		1.78	5	33.5	3.2
		98.09.03	0912	98-08912	94-98-00386	0.2	9.2	3.8	Q 1.8	1.91	10	33.8	3.1
		98.09.03	0919	98-08913	94-98-00387	5.0	9.26	3.9		1.86	10	33.5	3.1
		98.09.03	0920	98-08914	94-98-00388	7.4			Q 2.1				
		98.09.03	0926	98-08915	94-98-00389	9.0	9.16	3.9		1.87	5	33.9	3.1

Appendix 5b (cont.). 1996 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl "A" ug/l as Chl A	Cl mg/l as Cl-	Color as color units	Cond usie/cm	TOC mg/l as C
SCR-SPED 1	Spednic Lake - Station #1 (deep hole nr Forest City Ldg)	96.07.06	1320	96-05180	94-96-00268	0.2	8.75	3.5	Q 2.0	1.18	10	30.4	6.0
		96.07.06	1325	96-05181	94-96-00269	4.8			Q 1.9				
		96.07.06	1335	96-05182	94-96-00270	8.5	8.34	3.3		1.17	15	29.8	5.3
		96.07.06	1346	96-05183	94-96-00271	16.0	8.53	3.3		1.22	10	31.0	5.6
		96.08.05	1252	96-07059	94-96-00353	0.2	9.69	3.8	Q 1.9	1.35	5	34.4	5.6
		96.08.05	1250	96-07060	94-96-00354	5.8			Q 1.8				
		96.08.05	1300	96-07061	94-96-00355	6.0	9.12	3.6		1.30	5	32.7	5.1
		96.08.05	1356	96-07062	94-96-00354	12.0	9.08	3.6		1.29	5	33.8	4.7
		96.08.30	1446	96-08582	94-96-00382	0.2	9.52	3.9	Q 2.3	1.31	5	35.8	4.6
		96.08.30	1455	96-08583	94-96-00383	5.0			Q 3.6				
		96.08.30	1458	96-08584	94-96-00384	5.5	9.64	3.7		1.30	5	35.0	4.6
		96.08.30	1503	96-08585	94-96-00385		9.71	4.0		1.32	10	36.1	4.6
SCR-SPED 5	Spednic Lake - Station #5 (deep hole nr O'Malleys Is)	96.07.07	1200	96-05324	94-96-00291	0.2	6.19	2.6	Q 1.1	1.09	20	24.8	6.1
		96.07.07	1205	96-05325	94-96-00292	5.1			Q 0.4				
		96.07.07	1211	96-05326	94-96-00293	7.0	6.09	2.8		1.08	10	24.8	6.3
		96.07.07	1220	96-05327	94-96-00294	13.0	6.3	2.6		1.10	10	25.4	5.8
		96.08.03	1207	96-06808	94-96-00315	0.2	7.49	3.4	Q 2.6	1.14	10	28.4	5.2
		96.08.03	1211	96-06809	94-96-00316	4.1			Q 1.9				
		96.08.03	1217	96-06810	94-96-00317		6.97	3.2		1.13	10	27.8	5.1
		96.08.03	1223	96-06811	94-96-00318	11.2	6.88	3.0		1.14	15	27.6	5.1
		96.08.26	1245	96-08386	94-96-00370	0.2	7.32	3.0	Q 2.3	1.15	15	28.3	5.2
		96.08.26	1247	96-08387	94-96-00371	5.0			Q 2.8				
		96.08.26	1251	96-08388	94-96-00372	7.2	7.2	3.3		1.12	20	28.4	5.0
		96.08.26	1259	96-08389	94-96-00373	13.5	8.41	3.4		1.14	20	30.9	5.4
SCR-SPED 6	Spednic Lake - Station #6 (deep hole nr Walker Pt)	96.07.07	0947	96-05316	94-96-00283	0.2	7.61	3.2	Q 1.1	1.11	10	27.9	6.2
		96.07.07	0951	96-05317	94-96-00284	5.8			Q 0.9				
		96.07.07	1003	96-05318	94-96-00285	5.0	7.54	3.0		1.10	10	27.4	6.0
		96.07.07	1012	96-05319	94-96-00286	9.0	7.55	3.1		1.16	15	27.5	5.5
		96.08.03	1057	96-06804	94-96-00311	0.2	7.75	3.4	Q 2.4	1.16	5	29.7	4.9
		96.08.03	1104	96-06805	94-96-00312	5.0	7.88	3.4		1.16	5	29.7	4.8
		96.08.03	1107	96-06806	94-96-00313	5.5			Q 2.2				
		96.08.03	1114	96-06807	94-96-00314	9.0	7.82	3.5		1.22	10	29.8	4.7
		96.08.26	1004	96-08378	94-96-00362	0.2	8.07	3.3	Q 2.7	1.20	15	30.4	5.0
		96.08.26	1006	96-08379	94-96-00363	5.0			Q 2.8				
		96.08.26	1010	96-08380	94-96-00364	5.7	8.21	3.4		1.17	10	30.3	4.9
		96.08.26	1013	96-08381	94-96-00365	10.5	8.2	3.4		1.16	10	30.7	4.7
SCR-SPED 7	Spednic Lake - Station #7 (Palfrey Lake above Windy Pt)	96.07.07	1107	96-05320	94-96-00287	0.2	5.52	2.5	Q 0.6	0.99	20	22.9	6.3
		96.07.07	1111	96-05321	94-96-00288	5.1			Q 0.2				
		96.07.07	1118	96-05322	94-96-00289	8.5	5.5	2.5		0.94	20	23.0	6.0
		96.07.07		96-05323	94-96-00290	16.0	5.64	2.5		0.75	10	23.3	5.7

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl "A" ug/l as Chl A	Cl mg/l as Cl-	Color as color units	Cond usie/cm	TOC mg/l as C
SCR-SPED 7		98.08.03	1400	98-06812	94-98-00319	0.2	5.98	2.7	Q 2.9	1.03	10	25.4	5.1
		98.08.03	1403	98-06813	94-98-00320	5.1			Q 2.3				
		98.08.03	1409	98-06814	94-98-00321	7.2	5.9	2.7		1.05	10	25.1	5.2
		98.08.03	1415	98-06815	94-98-00322	12.0	6.22	2.8		1.02	15	26.3	4.8
		98.08.26	1132	98-06382	94-98-00366	0.2	5.98	2.6	Q 2.5	1.04	15	25.5	5.1
		98.08.26	1135	98-06383	94-98-00367	4.2	6.16	2.7		1.01	20	25.6	5.1
		98.08.26	1138	98-06384	94-98-00368	5.3			Q 2.1				
		98.08.26	1140	98-06385	94-98-00369	7.5	6.38	3.0		1.06	20	25.9	5.1
SCR-WAUK 1	Wauklehegan Lake - Station #1 (deep hole, east end)	98.07.08	1158	98-05431	94-98-00306	0.2	4.36	2.2	Q 3.4	2.27	30	26.8	8.8
		98.07.08	1205	98-05432	94-98-00307	0.2	4.22	2.2	Q 2.3	2.24	50	26.6	8.9
		98.07.08	1210	98-05433	94-98-00308	2.7			Q 5.1				
		98.07.08	1158	98-05434	94-98-00309	2.8	4.6	2.4		2.76	40	29.6	9.1
		98.07.08	1225	98-05435	94-98-00310	4.5	5.55	2.7		3.10	50	33.6	9.0
		98.08.04	1139	98-06900	94-98-00329	0.2	5.06	2.3	Q 6.1	2.37	40	28.9	8.2
		98.08.04	1145	98-06901	94-98-00330	2.0			Q 5.9				
		98.08.04	1148	98-06902	94-98-00331	2.4	4.68	2.3		2.32	40	28.6	8.2
		98.08.04	1154	98-06903	94-98-00332	3.8	4.68	2.4		2.44	40	29.5	8.2
		98.09.13	1403	98-09257	94-98-00406	0.2	5.36	2.4	Q 13.6	2.61	40	30.6	7.3
		98.09.13	1406	98-09258	94-98-00407	2.4			Q 17.0				
		98.09.13	1410	98-09259	94-98-00408	4.4	5.37	2.5		2.63	40	30.5	7.5
		98.09.13	1432	98-09260	94-98-00409		5.34	2.4		2.60	40	30.5	7.6
SCR-WAUK 2	Wauklehegan Lake - Station #2 (deep hole, west end)	98.07.08	1118	98-05427	94-98-00302	0.2	3.8	1.9	Q 2.6	1.92	40	24.3	8.1
		98.07.08	1125	98-05428	94-98-00303	1.8	4.1	2.0		1.91	30	24.2	8.3
		98.07.08	1131	98-05429	94-98-00304	2.6	3.91	2.0		1.86	40	24.5	8.1
		98.07.08	1125	98-05430	94-98-00305	3.2			Q 4.3				
		98.08.04	1222	98-06896	94-98-00325	0.2	4.33	2.6	Q 3.6	2.07	40	26.9	7.6
		98.08.04	1225	98-06897	94-98-00326	2.0	4.28	2.5		2.07	40	26.8	8.0
		98.08.04	1230	98-06898	94-98-00327	2.5			Q 3.3				
		98.08.04	1238	98-06899	94-98-00328	3.0	4.29	2.1		2.07	30	26.8	7.7
		98.09.13	1432	98-09253	94-98-00402	0.2	4.43	2.2	Q 4.2	2.21	40	27.8	7.1
		98.09.13	1435	98-09254	94-98-00403	2.0	4	2.1		2.24	30	27.6	7.1
		98.09.13	1439	98-09255	94-98-00404	2.6			Q 4.9				
		98.09.13	1441	98-09256	94-98-00405	3.1	4.45	2.2		2.22	30	27.4	7.2

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P	Fecal coliforms CFU/100ml	Total Coliforms MPN/100ml
SCR CNOS 1	98.07.08	0909	98-05424	94-98-00299	0.188	1.9	L 0	7.23	1.54	1.65	0.011		
	98.07.08	0916	98-05425	94-98-00300	0.214	1.8	L 0	7.24	1.66	1.65	0.01		
	98.07.08	0920	98-05426	94-98-00301						1.65			
	98.08.04	0919	98-06894	94-98-00323	0.160	2.3	L 0	7.14	1.78	1.5	0.016	ND, ND	1300, 1120
	98.08.04	0925	98-06895	94-98-00323	0.155	2.3	L 0	7.16	1.49	1.5	0.015		
	98.09.13	1120	98-09251	94-98-00401	0.185	2.1	L 0	7.17	1.05	NA	0.013	13, 10	649, 548
	98.09.13	1120	98-09252	94-98-00401	0.183	2.2	L 0	7.14	1.04	NA	0.01	7, 14	579, 548
SCR EGR 1	98.07.06	0940	98-05172	94-98-00260	0.250	1.2	L 0	7.26	2.65	6.6	L 0	<2, <2	10,2
	98.07.06	0952	98-05173	94-98-00261						6.6		<2	2
	98.07.06	1010	98-05174	94-98-00262	0.268	1.3	L 0	7.06	2.96	6.6	L 0		
	98.07.06	1020	98-05175	94-98-00263	0.304	1.3	L 0	7.06	2.65	6.6	L 0		
	98.08.05	0948	98-07051	94-98-00345	0.317	1.4	L 0	7.47	2.91	9.0	L 0	ND, ND	75, 84
	98.08.05	0952	98-07052	94-98-00346						9.0			
	98.08.05	0957	98-07053	94-98-00347	0.339	1.4	L 0	7.47	3.01	9.0	L 0		
	98.08.05	1001	98-07054	94-98-00348	0.271	1.3	L 0	7.16	2.91	9.0	L 0		
	98.08.30	1203	98-08574	94-98-00374	0.307	1.4	L 0	7.37	2.79	8.6	L 0	ND, ND	70, 35
	98.08.30	1207	98-08575	94-98-00375						8.6			
	98.08.30	1211	98-08576	94-98-00376	0.309	1.4	L 0	7.17	2.94	8.6	L 0		
	98.08.30	1214	98-08577	94-98-00377	0.291	1.3	0.09	6.80	2.98	8.6	L 0		
SCR EGR 4	98.07.06	1122	98-05176	94-98-00264	0.261	1.2	L 0	7.23	2.50	7.0	L 0	8	40
	98.07.06	1130	98-05177	94-98-00265						7.0		4	40
	98.07.06	1139	98-05178	94-98-00266	0.256	1.2	L 0	7.29	2.84	7.0	L 0		
	98.07.06	1149	98-05179	94-98-00267	0.272	1.3	L 0	7.13	2.85	7.0	L 0		
	98.08.05	1100	98-07055	94-98-00350	0.298	1.3	L 0	7.43	2.85	9.0	L 0	ND, ND	141, 81
	98.08.05	1110	98-07056	94-98-00351	0.291	1.2	L 0	7.34	2.78	9.0	L 0		
	98.08.05	1114	98-07057	94-98-00352						9.0			
	98.08.05	1119	98-07058	94-98-00353	0.322	1.3	L 0	7.04	2.88	9.0	L 0		
	98.08.30	1318	98-08578	94-98-00378	0.317	1.4	L 0	7.36	2.67	8.3	L 0	ND, ND	108, 152
	98.08.30	1321	98-08579	94-98-00379	0.308	1.3	L 0	7.31	2.79	8.3	L 0		
	98.08.30	1324	98-08580	94-98-00380						8.3			
	98.08.30	1328	98-08581	94-98-00381	0.313	1.3	L 0	7.19	2.84	8.3	L 0		
SCR EGR 6	98.07.06	1655	98-05184	94-98-00272	0.247	1.2	L 0	7.26	2.50	6.0	L 0	<2	12
	98.07.06	1700	98-05185	94-98-00273						6.0		<2	10
	98.07.06	1706	98-05186	94-98-00274	0.235	1.2	L 0	7.18	2.48	6.0	L 0		
	98.07.06	1712	98-05187	94-98-00275	0.265	1.2	L 0	7.13	2.64	6.0	L 0		
	98.08.04	1447	98-06904	94-98-00333	0.345	1.4	L 0	7.32	2.83	5.6	L 0	ND, 1	23, 39
	98.08.04	1453	98-06905	94-98-00334	0.332	1.3	L 0	7.31	2.77	5.6	L 0		
	98.08.04	1456	98-06906	94-98-00335						5.6			
	98.08.04	1501	98-06907	94-98-00336	0.362	1.3	L 0	7.30	2.90	5.6	L 0		

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P	Fecal coliforms CFU/100ml	Total Coliforms MPN/100ml
	98.09.03	1125	98-08916	94-98-00390	0.315	1.3	L 0	7.27	3.11	7.0	0.005	ND, 1	135, 101
	98.09.03	1130	98-08917	94-98-00391	0.300	1.3	L 0	7.27	2.91	7.0	0.005		
	98.09.03	1134	98-08918	94-98-00392	0.330	1.3	L 0	7.34	2.90	7.0	0.005		
	98.09.03	1136	98-08919	94-98-00393						7.0			
SCR NTH 1	98.07.06	1804	98-05191	94-98-00279	0.239	1.2	L 0	7.28	1.81	2.7	0.007	6	396
	98.07.06	1812	98-05192	94-98-00280						2.7		<2	420
	98.07.06	1815	98-05193	94-98-00281	0.231	1.3	L 0	7.37	1.98	2.7	0.006		
	98.07.06	1819	98-05194	94-98-00282	0.204	1.3	L 0	7.29	1.99	2.7	0.01		
	98.08.04	1608	98-06912	94-98-00341	0.268	1.4	L 0	7.42	2.14	2.6	L 0	ND, ND	145, 120
	98.08.04	1612	98-06913	94-98-00342	0.334	1.5	L 0	7.45	2.15	2.6	L 0		
	98.08.04	1615	98-06914	94-98-00343						2.6			
	98.08.04	1618	98-06915	94-98-00344	0.302	1.5	L 0	7.46	2.15	2.6	L 0		
	98.09.03	1232	98-08924	94-98-00398	0.280	1.4	L 0	7.42	2.25	2.9	0.005	ND, ND	148, 129
	98.09.03	1238	98-08925	94-98-00399	0.280	1.4	L 0	7.41	2.47	2.9	0.005		
	98.09.03	1242	98-08926	94-98-00400	0.252	1.4	L 0	7.46	2.32	2.9	0.005		
SCR NTH 2	98.07.06	1730	98-05188	94-98-00276	0.220	1.3	L 0	7.45	1.78	3.0	0.005	18	822
	98.07.06	1745	98-05189	94-98-00277	0.240	1.3	L 0	7.36	1.68	3.2	L 0	8	476
	98.07.06	1749	98-05190	94-98-00278	0.208	1.2	L 0	7.26	2.18	3.2	0.005		
	98.08.04	1541	98-06908	94-98-00337	0.278	1.4	L 0	7.48	2.30	3.6	L 0		
	98.08.04	1544	98-06909	94-98-00338	0.289	1.4	L 0	7.38	2.20	3.6	L 0		
	98.08.04	1447	98-06910	94-98-00339						3.6		ND, ND	866, 579
	98.08.04	1550	98-06911	94-98-00340	0.283	1.4	L 0	7.39	2.17	3.6	L 0		
	98.09.03	1211	98-08920	94-98-00394	0.268	1.4	L 0	7.47	2.27	3.8	0.005	ND, 1	86, 108
	98.09.03	1214	98-08921	94-98-00395	0.275	1.4	L 0	7.49	2.24	3.8	0.005		
	98.09.03	1216	98-08922	94-98-00396						3.8			
	98.09.03	1219	98-08923	94-98-00397	0.289	1.4	L 0	7.50	2.23	3.8	L 0		
											L 0		
SCR SKIF 1	98.07.07	1423	98-05328	94-98-00295	0.331	1.3	L 0	7.31	2.01	7.8	L 0	22	<2
	98.07.07	1437	98-05329	94-98-00296	0.378	1.3	L 0	7.30	2.20	7.8	L 0	24	<2
	98.07.07	1440	98-05330	94-98-00297						7.8			
	98.07.07	1450	98-05331	94-98-00298	0.326	1.3	L 0	6.90	2.35	7.8	L 0		
	98.08.05	1502	98-07063	94-98-00357	0.359	1.4	L 0	7.46	2.55	7.5	L 0	ND, ND	225, 261
	98.08.05	1505	98-07064	94-98-00358	0.331	1.3	L 0	7.42	2.59	7.5	L 0	ND, ND	158, 153
	98.08.05	1510	98-07065	94-98-00359	0.357	1.4	L 0	7.40	2.51	7.5	L 0		
	98.08.05	1515	98-07066	94-98-00360						7.5			
	98.08.05	1526	98-07067	94-98-00361	0.328	1.3	L 0	7.26	2.60	7.5	L 0		
	98.09.03	0912	98-08912	94-98-00386	0.354	1.5	L 0	7.31	2.67	7.4	L 0	ND, ND	86, 99
	98.09.03	0919	98-08913	94-98-00387	0.382	1.4	L 0	7.32	2.67	7.4	L 0		
	98.09.03	0920	98-08914	94-98-00388						7.4			
	98.09.03	0926	98-08915	94-98-00389	0.351	1.4	L 0	7.34	2.85	7.4	L 0		

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P	Fecal coliforms CFU/100ml	Total Coliforms MPN/100ml
SCR SPED 1	98.07.06	1320	98-05180	94-98-00266	0.266	1.2	L 0	7.19	2.35	4.8	0.005	<2	2828
	98.07.06	1325	98-05181	94-98-00269						4.8		<2	2092
	98.07.06	1335	98-05182	94-98-00270	0.207	1.1	L 0	7.10	2.35	4.8	L 0		
	98.07.06	1346	98-05183	94-98-00271	0.222	1.1	0.08	6.69	2.68	4.8	0.005		
	98.08.05	1252	98-07059	94-98-00353	0.287	1.2	L 0	7.40	2.68	5.8	L 0	ND, ND	>2419, >2419
	98.08.05	1250	98-07060	94-98-00354						5.8			
	98.08.05	1300	98-07061	94-98-00355	0.316	1.2	L 0	7.29	2.71	5.8	L 0		
	98.08.05	1356	98-07062	94-98-00354	0.311	1.2	L 0	6.94	2.82	5.8	L 0		
	98.08.30	1446	98-08582	94-98-00382	0.310	1.3	L 0	7.20	2.64	5.0	0.005	ND, ND	62, 57
	98.08.30	1455	98-08583	94-98-00383						5.0			
	98.08.30	1458	98-08584	94-98-00384	0.301	1.3	L 0	7.30	2.66	5.0	L 0		
	98.08.30	1503	98-08585	94-98-00385	0.305	1.3	0.05	7.12	2.74	5.0	L 0		
SCR SPED 5	98.07.07	1200	98-05324	94-98-00291	0.214	1.1	L 0	7.10	2.26	5.1	L 0	22	<2
	98.07.07	1205	98-05325	94-98-00292						5.1		32	<2
	98.07.07	1211	98-05326	94-98-00293	0.247	1.2	L 0	7.02	2.29	5.1	L 0		
	98.07.07	1220	98-05327	94-98-00294	0.271	1.1	L 0	6.85	2.28	5.1	L 0		
	98.08.03	1207	98-06808	94-98-00315	0.283	1.2	L 0	7.27	2.68	4.1	L 0	1, 1	89, 117
	98.08.03	1211	98-06809	94-98-00316						4.1			
	98.08.03	1217	98-06810	94-98-00317	0.242	1.2	L 0	7.14	2.69	4.1	L 0		
	98.08.03	1223	98-06811	94-98-00318	0.232	1.2	L 0	7.09	2.64	4.1	L 0		
	98.08.26	1245	98-08386	94-98-00370	0.299	1.2	L 0	7.16	2.73	5.0	L 0	ND, ND	73, 115
	98.08.26	1247	98-08387	94-98-00371						5.0			
	98.08.26	1251	98-08388	94-98-00372	0.313	1.3	L 0	7.08	2.90	5.0	0.005		
	98.08.26	1259	98-08389	94-98-00373	0.323	1.1	0.07	6.79	2.66	5.0	0.009		
SCR SPED 6	98.07.07	0947	98-05316	94-98-00283	0.247	1.2	L 0	7.16	2.39	5.8	L 0	10	<2
	98.07.07	0951	98-05317	94-98-00284						5.8		30	2
	98.07.07	1003	98-05318	94-98-00285	0.234	1.1	L 0	7.16	2.35	5.8	L 0		
	98.07.07	1012	98-05319	94-98-00286	0.239	1.1	L 0	6.97	2.45	5.8	L 0		
	98.08.03	1057	98-06804	94-98-00311	0.247	1.2	L 0	7.29	2.68	5.6	L 0	1, 1	35, 1
	98.08.03	1104	98-06805	94-98-00312	0.245	1.1	L 0	7.22	2.60	5.6	L 0		
	98.08.03	1107	98-06806	94-98-00313						5.6			
	98.08.03	1114	98-06807	94-98-00314	0.267	1.2	L 0	7.27	2.93	5.6	L 0		
	98.08.26	1004	98-08378	94-98-00362	0.312	1.2	L 0	7.26	2.85		L 0	ND, ND	54, 58
	98.08.26	1006	98-08379	94-98-00363						5.0			
	98.08.26	1010	98-08380	94-98-00364	0.296	1.3	L 0	7.12	2.71	5.0	0.006		
	98.08.26	1013	98-08381	94-98-00365	0.303	1.2	L 0	7.22	2.82	5.0	0.005		
SCR SPED 7	98.07.07	1107	98-05320	94-98-00287	0.249	1.1	L 0	7.04	2.21	5.1	L 0	20	2
	98.07.07	1111	98-05321	94-98-00288						5.1		28	2
	98.07.07	1118	98-05322	94-98-00289	0.252	1.1	L 0	6.78	2.05	5.1	L 0		
	98.07.07		98-05323	94-98-00290	0.239	1.1	L 0	6.66	2.02	5.1	L 0		

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P	Fecal coliforms CFU/100ml	Total Coliforms MPN/100ml
	98.08.03	1400	98-06812	94-98-00319	0.343	1.1	L 0	7.16	2.79	5.1	L 0	ND, ND	31, 29
	98.08.03	1403	98-06813	94-98-00320						5.1			
	98.08.03	1409	98-06814	94-98-00321	0.323	1.1	L 0	7.02	2.54	5.1	L 0		
	98.08.03	1415	98-06815	94-98-00322	0.346	1.1	L 0	6.68	2.66	5.1	L 0		
	98.08.26	1132	98-08382	94-98-00366	0.278	1.1	L 0	7.00	2.41	5.3	L 0	1, ND	114, 117
	98.08.26	1135	98-08383	94-98-00367	0.292	1.2	L 0	7.07	2.01	5.3	0.009		
	98.08.26	1138	98-08384	94-98-00368						5.3			
	98.08.26	1140	98-08385	94-98-00369	0.303	1.3	L 0	7.01	2.64	5.3	0.005		
SCR WAUK 1	98.07.08	1158	98-05431	94-98-00306	0.286	2	L 0	6.85	2.27	2.7	0.006		
	98.07.08	1205	98-05432	94-98-00307	0.320	2	L 0	6.91	3.14	2.7	0.006		
	98.07.08	1210	98-05433	94-98-00308						2.7			
	98.07.08	1158	98-05434	94-98-00309	0.318	2.3	L 0	6.87	2.39	2.7	0.008		
	98.07.08	1225	98-05435	94-98-00310	0.338	2.7	L 0	6.83	2.47	2.7	0.009		
	98.08.04	1139	98-06900	94-98-00329	0.398	2.2	L 0	6.95	2.33	2.0	0.006	ND, ND	579, 579
	98.08.04	1145	98-06901	94-98-00330						2.0			
	98.08.04	1148	98-06902	94-98-00331	0.380	2.2	L 0	6.82	2.18	2.0	0.007		
	98.08.04	1154	98-06903	94-98-00332	0.376	2.3	L 0	6.72	2.47	2.0	0.008		
	98.09.13	1403	98-09257	94-98-00406	0.401	2.4	L 0	6.93	2.42	2.4	0.009	2, ND	276, 387
	98.09.13	1406	98-09258	94-98-00407						2.4			
	98.09.13	1410	98-09259	94-98-00408	0.407	2.4	L 0	6.98	2.44	2.4	0.01		
	98.09.13	1432	98-09260	94-98-00409	0.408	2.3	L 0	6.98	2.25	2.4	0.01		
SCR WAUK 2	98.07.08	1118	98-05427	94-98-00302	0.264	1.7	L 0	6.81	2.39	3.2	0.016		
	98.07.08	1125	98-05428	94-98-00303	0.290	1.7	L 0	6.74	2.39	3.2	L 0		
	98.07.08	1131	98-05429	94-98-00304	0.391	1.7	L 0	6.78	2.30	3.2	0.009		
	98.07.08	1125	98-05430	94-98-00305						3.2			
	98.08.04	1222	98-06896	94-98-00325	0.359	2.2	L 0	6.77	2.39	2.5	L 0	ND, ND	160, 115
	98.08.04	1225	98-06897	94-98-00326	0.348	2.2	L 0	6.84	2.27	2.5	0.005		
	98.08.04	1230	98-06898	94-98-00327						2.5			
	98.08.04	1238	98-06899	94-98-00328	0.367	1.9	L 0	6.85	2.33	2.5	0.005		
	98.09.13	1432	98-09253	94-98-00402	0.366	2	L 0	6.76	2.15	2.6	0.009	ND, ND	114, 142
	98.09.13	1435	98-09254	94-98-00403	0.361	2	L 0	6.44	2.24	2.6	0.008		
	98.09.13	1439	98-09255	94-98-00404						2.6			
	98.09.13	1441	98-09256	94-98-00405	0.358	2.1	L 0	6.81	2.17	2.6	0.008		

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. Coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO3 D mg/l as N	NO4 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3
SCR CNOS 1	98.07.08	0909	98-05424	94-98-00299		0.7	T 1	0.013	L 0	L 0	0.64	L 0	17.6
	98.07.08	0916	98-05425	94-98-00300		0.7	T 1	0.016	L 0	L 0	0.64	L 0	17.4
	98.07.08	0920	98-05426	94-98-00301									
	98.08.04	0919	98-06894	94-98-00323	ND, 1	0.7	T 2	0.028	L 0	L 0	0.65	L 0	19.7
	98.08.04	0925	98-06895	94-98-00323		0.5	T 2	0.028	L 0	L 0	0.68	L 0	19.7
	98.09.13	1120	98-09251	94-98-00401	10, 6	0.9	T 5.4	0.01	L 0	L 0	0.71	L 0	16.8
	98.09.13	1120	98-09252	94-98-00401	5, 11	0.9	T 5.4	L 0	L 0	L 0	0.71	L 0	17.0
SCR EGR 1	98.07.06	0940	98-05172	94-98-00260	2	0	T 0	L 0	L 0	L 0	L 0	L 0	12.0
	98.07.06	0952	98-05173	94-98-00261	<2								
	98.07.06	1010	98-05174	94-98-00262		0	T 0	L 0	L 0	L 0	L 0	L 0	12.5
	98.07.06	1020	98-05175	94-98-00263		0	T 0	0.022	L 0	L 0	L 0	L 0	12.5
	98.08.05	0948	98-07051	94-98-00345	ND, 1	0	T 0	L 0	L 0	L 0	L 0	L 0	14.7
	98.08.05	0952	98-07052	94-98-00346									
	98.08.05	0957	98-07053	94-98-00347		0	T 0	0.01	L 0	L 0	L 0	L 0	14.0
	98.08.05	1001	98-07054	94-98-00348		0	T 0	0.017	L 0	L 0	L 0	L 0	13.1
	98.08.30	1203	98-08574	94-98-00374	ND, 1	0.2	T 0.02	L 0	L 0	L 0	0.22	L 0	13.0
	98.08.30	1207	98-08575	94-98-00375									
	98.08.30	1211	98-08576	94-98-00376		0.1	T 0.16	L 0	L 0	L 0	0.20	L 0	13.0
	98.08.30	1214	98-08577	94-98-00377		0.2	T 0.2	L 0	L 0	0.04	0.20	L 0	12.7
SCR EGR 4	98.07.06	1122	98-05176	94-98-00264	2	0	T 0	L 0	L 0	L 0	L 0	L 0	12.2
	98.07.06	1130	98-05177	94-98-00265	<2								
	98.07.06	1139	98-05178	94-98-00266		0.1	T 0	L 0	L 0	L 0	L 0	L 0	12.2
	98.07.06	1149	98-05179	94-98-00267		0	T 0	0.011	L 0	L 0	L 0	L 0	12.7
	98.08.05	1100	98-07055	94-98-00350	1, ND	0		0.011	L 0	L 0	L 0	L 0	13.4
	98.08.05	1110	98-07056	94-98-00351		0		0.013	L 0	L 0	0.20	L 0	12.9
	98.08.05	1114	98-07057	94-98-00352									
	98.08.05	1119	98-07058	94-98-00353		0		0.022	L 0	L 0	L 0	L 0	13.9
	98.08.30	1318	98-08578	94-98-00378	ND, ND	0.1	T 0.02	L 0	L 0	L 0	0.20	L 0	13.6
	98.08.30	1321	98-08579	94-98-00379		0.1	T 0.26	L 0	L 0	L 0	0.22	L 0	12.5
	98.08.30	1324	98-08580	94-98-00380									
	98.08.30	1328	98-08581	94-98-00381		0	T 0.34	L 0	L 0	L 0	0.22	L 0	13.0
SCR EGR 6	98.07.06	1655	98-05184	94-98-00272	2	0	T 0	L 0	L 0	L 0	0.26	L 0	12.5
	98.07.06	1700	98-05185	94-98-00273	<2								
	98.07.06	1706	98-05186	94-98-00274		0	T 0	L 0	L 0	L 0	L 0	L 0	12.6
	98.07.06	1712	98-05187	94-98-00275		0.1	T 0	L 0	L 0	L 0	L 0	L 0	11.8
	98.08.04	1447	98-06904	94-98-00333	ND, 1	0	T 0	L 0	L 0	L 0	0.32	L 0	13.7
	98.08.04	1453	98-06905	94-98-00334		0	T 0	L 0	L 0	L 0	L 0	L 0	13.7
	98.08.04	1456	98-06906	94-98-00335									
	98.08.04	1501	98-06907	94-98-00336		0	T 0	0.01	L 0	L 0	L 0	L 0	13.0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. Coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO3 D mg/l as N	NO4 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3
	98.09.03	1125	98-08916	94-98-00390	1, 1	0.1	T 0	L 0	L 0	L 0	0.22	L 0	13.5
	98.09.03	1130	98-08917	94-98-00391		0	T 0	L 0	L 0	L 0	0.22	L 0	13.9
	98.09.03	1134	98-08918	94-98-00392		0.1	T 13.5	L 0	L 0	L 0	0.22	L 0	13.9
	98.09.03	1136	98-08919	94-98-00393									
SCR NTH 1	98.07.06	1804	98-05191	94-98-00279	2	0.4	T 0	0.01	L 0	L 0	0.38	L 0	14.4
	98.07.06	1812	98-05192	94-98-00280	8								
	98.07.06	1815	98-05193	94-98-00281		0.4	T 0	L 0	L 0	L 0	0.34	L 0	15.9
	98.07.06	1819	98-05194	94-98-00282		0.4	T 0	0.015	L 0	L 0	0.32	L 0	15.9
	98.08.04	1608	98-06912	94-98-00341	ND, 2	0.2	T 1	L 0	L 0	L 0	0.34	L 0	18.3
	98.08.04	1612	98-06913	94-98-00342		0.3	T 1	L 0	L 0	L 0	0.30	L 0	18.5
	98.08.04	1615	98-06914	94-98-00343									
	98.08.04	1618	98-06915	94-98-00344		0.2	T 1	0.012	L 0	L 0	0.30	L 0	18.7
	98.09.03	1232	98-08924	94-98-00398	ND, 1	0.4	T 0.01	L 0	L 0	L 0	0.42	L 0	19.0
	98.09.03	1238	98-08925	94-98-00399		0.3	T 0.8	L 0	L 0	L 0	0.34	L 0	19.0
	98.09.03	1242	98-08926	94-98-00400		0.3	T 0.44	L 0	L 0	L 0	0.36	L 0	19.0
SCR NTH 2	98.07.06	1730	98-05188	94-98-00276	8	0.3	T 0	L 0	L 0	L 0	0.34	L 0	18.7
	98.07.06	1745	98-05189	94-98-00277	4	0.3	T 0	0.01	L 0	L 0	0.30	L 0	16.4
	98.07.06	1749	98-05190	94-98-00278		0.4	T 0	0.017	L 0	L 0	0.30	L 0	15.9
	98.08.04	1541	98-06908	94-98-00337		0	T 0	0.01	L 0	L 0	0.29	L 0	18.5
	98.08.04	1544	98-06909	94-98-00338		0.1	T 0	0.015	L 0	L 0	0.30	L 0	18.8
	98.08.04	1447	98-06910	94-98-00339	1, ND								
	98.08.04	1550	98-06911	94-98-00340		0	T 0	0.015	L 0	L 0	0.28	L 0	18.8
	98.09.03	1211	98-08920	94-98-00394	ND, 2	0.2	T 0.32	L 0	L 0	L 0	0.34	L 0	20.0
	98.09.03	1214	98-08921	94-98-00395		0.4	T 0.24	L 0	L 0	L 0	0.37	L 0	19.5
	98.09.03	1216	98-08922	94-98-00396									
	98.09.03	1219	98-08923	94-98-00397		0.2	T 0.32	L 0	L 0	L 0	0.36	L 0	19.5
SCR SKIF 1	98.07.07	1423	98-05328	94-98-00295	<2	0.3	T 0	L 0	L 0	L 0	0.34	L 0	10.1
	98.07.07	1437	98-05329	94-98-00296	<2	0.1	T 0	L 0	L 0	L 0	L 0	L 0	10.1
	98.07.07	1440	98-05330	94-98-00297									
	98.07.07	1450	98-05331	94-98-00298		0.2	T 0	L 0	L 0	L 0	L 0	L 0	10.5
	98.08.05	1502	98-07063	94-98-00357	1, ND	0	T 0	L 0	L 0	L 0	L 0	L 0	11.0
	98.08.05	1505	98-07064	94-98-00358	ND, ND	0	T 0	L 0	L 0	L 0	L 0	L 0	10.1
	98.08.05	1510	98-07065	94-98-00359		0	T 0	L 0	L 0	L 0	L 0	L 0	11.0
	98.08.05	1515	98-07066	94-98-00360									
	98.08.05	1526	98-07067	94-98-00361		0	T 1	L 0	L 0	L 0	L 0	L 0	11.0
	98.09.03	0912	98-08912	94-98-00386	ND, ND	0.1	T 0.22	L 0	L 0	L 0	L 0	L 0	11.5
	98.09.03	0919	98-08913	94-98-00387		0	T 0.08	L 0	L 0	L 0	L 0	L 0	11.4
	98.09.03	0920	98-08914	94-98-00388									
	98.09.03	0926	98-08915	94-98-00389		0.1	T 0.26	L 0	L 0	L 0	L 0.20	L 0	11.4

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. Coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO3 D mg/l as N	NO4 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3
SCR SPED 1	98.07.06	1320	98-05180	94-98-00266	<2	0.2	T 0	L 0	L 0	L 0	0.20	L 0	11.2
	98.07.06	1325	98-05181	94-98-00269	4								
	98.07.06	1335	98-05182	94-98-00270		0.2	T 0	0.018	L 0	L 0	0.20	L 0	10.3
	98.07.06	1346	98-05183	94-98-00271		0.2	T 0	0.023	L 0	0.03	0.20	L 0	10.3
	98.08.05	1252	98-07059	94-98-00353	ND, 1	0	T 0	L 0	L 0	L 0	0.22	L 0	12.0
	98.08.05	1250	98-07060	94-98-00354									
	98.08.05	1300	98-07061	94-98-00355		0	T 0	0.025	L 0	L 0	0.23	L 0	11.9
	98.08.05	1356	98-07062	94-98-00354		0	T 1	0.22	L 0	L 0	0.22	L 0	11.9
	98.08.30	1446	98-08582	94-98-00382	ND, 2	0.2	T 0.26	L 0	L 0	L 0	0.24	L 0	12.2
	98.08.30	1455	98-08583	94-98-00383									
	98.08.30	1458	98-08584	94-98-00384		0.2	T 0.26	L 0	L 0	L 0	0.28	L 0	11.7
	98.08.30	1503	98-08585	94-98-00385		0.7	T 1.18	0.021	L 0	L 0	0.30	L 0	12.5
SCR SPED 5	98.07.07	1200	98-05324	94-98-00291	<2	0.2	T 0	L 0	L 0	L 0	0.24	L 0	8.6
	98.07.07	1205	98-05325	94-98-00292	<2								
	98.07.07	1211	98-05326	94-98-00293		0.3	T 0	0.014	L 0	L 0	0.20	L 0	9.1
	98.07.07	1220	98-05327	94-98-00294		0.5	T 0		L 0	L 0	0.22	L 0	8.1
	98.08.03	1207	98-06808	94-98-00315	ND, 1	0.2	T 1	0.01	L 0	L 0	0.23	L 0	10.1
	98.08.03	1211	98-06809	94-98-00316									
	98.08.03	1217	98-06810	94-98-00317		0.2	T 1	0.011	L 0	L 0	0.38	L 0	10.0
	98.08.03	1223	98-06811	94-98-00318		0.3	T 1	0.019	L 0	L 0	0.25	L 0	9.5
	98.08.26	1245	98-08386	94-98-00370	1, 1	0.2	T 0.26	L 0	L 0	L 0	0.20	L 0	9.5
	98.08.26	1247	98-08387	94-98-00371									
	98.08.26	1251	98-08388	94-98-00372		0.3	T 0.48	L 0	L 0	L 0	0.20	L 0	10.7
	98.08.26	1259	98-08389	94-98-00373		0.5	T 0.5	0.056	L 0	0.02	0.32	L 0	10.1
SCR SPED 6	98.07.07	0947	98-05316	94-98-00283	<2	0.2	T 0	L 0	L 0	L 0	0.22	L 0	10.0
	98.07.07	0951	98-05317	94-98-00284	<2								
	98.07.07	1003	98-05318	94-98-00285		0.3	T 6	0.011	L 0	L 0	0.20	L 0	9.5
	98.07.07	1012	98-05319	94-98-00286		0.3	T 0	0.018	L 0	L 0	0.23	L 0	9.8
	98.08.03	1057	98-06804	94-98-00311	1, 1	0.1	T 0	0.018	L 0	L 0	0.29	L 0	10.5
	98.08.03	1104	98-06805	94-98-00312		0.2	T 1	0.021	L 0	L 0	0.24	L 0	10.5
	98.08.03	1107	98-06806	94-98-00313									
	98.08.03	1114	98-06807	94-98-00314		0.1	T 0	0.012	L 0	L 0	0.22	L 0	10.8
	98.08.26	1004	98-08378	94-98-00362	2, ND	0.2	T 0.06	L 0	L 0	L 0	L 0	L 0	10.7
	98.08.26	1006	98-08379	94-98-00363									
	98.08.26	1010	98-08380	94-98-00364		0.3	T 0.06	L 0	L 0	L 0	L 0	L 0	11.0
	98.08.26	1013	98-08381	94-98-00365		0.3	T 0.6	L 0	L 0	L 0	L 0	L 0	11.0
SCR SPED 7	98.07.07	1107	98-05320	94-98-00287	<2	0.1	T 0	L 0	L 0	L 0	0.22	L 0	7.9
	98.07.07	1111	98-05321	94-98-00288	<2								
	98.07.07	1118	98-05322	94-98-00289		0.1	T 0	0.015	L 0	L 0	0.22	L 0	7.9
	98.07.07		98-05323	94-98-00290		0.1	T 0	0.027	L 0	L 0	0.26	L 0	7.9

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. Coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO3 D mg/l as N	NO4 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3
	98.08.03	1400	98-06812	94-98-00319	2, ND	0	T 0	L 0	L 0	L 0	0.24	L 0	8.0
	98.08.03	1403	98-06813	94-98-00320									
	98.08.03	1409	98-06814	94-98-00321		0	T 0	0.012	L 0	L 0	0.21	L 0	8.4
	98.08.03	1415	98-06815	94-98-00322		0	T 0	0.03	L 0	L 0	0.21	L 0	8.6
	98.08.26	1132	98-08382	94-98-00366	ND, 3	0.2	T 0.06	L 0	L 0	L 0	L 0	L 0	8.6
	98.08.26	1135	98-08383	94-98-00367		0.1	T 0.08	L 0	L 0	L 0	L 0	L 0	8.4
	98.08.26	1138	98-08384	94-98-00368									
	98.08.26	1140	98-08385	94-98-00369		0	T 0.02	L 0	L 0	L 0	L 0	L 0	9.5
SCR WAUK 1	98.07.08	1158	98-05431	94-98-00306		0.3	T 0	0.013	L 0	L 0	0.34	L 0	6.7
	98.07.08	1205	98-05432	94-98-00307		0.3	T 1	0.011	L 0	L 0	0.31	L 0	7.1
	98.07.08	1210	98-05433	94-98-00308									
	98.07.08	1158	98-05434	94-98-00309		0.4	T 1	0.018	L 0	L 0	0.35	L 0	7.6
	98.07.08	1225	98-05435	94-98-00310		0.4	T 1	0.036	L 0	L 0	0.29	L 0	8.4
	98.08.04	1139	98-06900	94-98-00329	ND, 1	0.3	T 1	0.011	L 0	L 0	0.34	L 0	7.4
	98.08.04	1145	98-06901	94-98-00330									
	98.08.04	1148	98-06902	94-98-00331		0.3	T 2	0.01	L 0	L 0	0.33	L 0	7.4
	98.08.04	1154	98-06903	94-98-00332		0.5	T 2	0.012	L 0	L 0	0.30	L 0	7.6
	98.09.13	1403	98-09257	94-98-00406	3, 2	0.8	T 0.8	L 0	L 0	L 0	0.36	L 0	7.6
	98.09.13	1406	98-09258	94-98-00407									
	98.09.13	1410	98-09259	94-98-00408		0.9	T 1.3	L 0	L 0	L 0	0.40	L 0	8.3
	98.09.13	1432	98-09260	94-98-00409		1.3	T 1.2	L 0	L 0	L 0	0.35	L 0	8.1
SCR WAUK 2	98.07.08	1118	98-05427	94-98-00302		0.3	T 0	L 0	L 0	L 0	0.26	L 0	6.0
	98.07.08	1125	98-05428	94-98-00303		0.3	T 1	0.01	L 0	L 0	0.27	L 0	6.2
	98.07.08	1131	98-05429	94-98-00304		0.3	T 1	0.011	L 0	L 0	0.26	L 0	6.2
	98.07.08	1125	98-05430	94-98-00305									
	98.08.04	1222	98-06896	94-98-00325	ND, ND	0.2	T 1	L 0	L 0	L 0	0.26	L 0	8.6
	98.08.04	1225	98-06897	94-98-00326		0.2	T 1	0.011	L 0	L 0	0.28	L 0	7.9
	98.08.04	1230	98-06898	94-98-00327									
	98.08.04	1238	98-06899	94-98-00328		0.2	T 1	0.01	L 0	L 0	0.30	L 0	6.9
	98.09.13	1432	98-09253	94-98-00402	ND, 1	0.4	T 1.3	L 0	L 0	L 0	0.31	L 0	7.1
	98.09.13	1435	98-09254	94-98-00403		0.4	T 1.3	L 0	L 0	L 0	0.31	L 0	6.9
	98.09.13	1439	98-09255	94-98-00404									
	98.09.13	1441	98-09256	94-98-00405		0.4	T 1.1	L 0	L 0	L 0	0.34	L 0	7.1

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	AL ug/l as Al	AS ug/l as As	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni
SCR CNOS 1	98.07.08	0909	98-05424	94-98-00299	69.5	L 0	L 0	L 0	L 0	0.16	1.0	0.031	L 0
	98.07.08	0916	98-05425	94-98-00300	69.9	L 0	L 0	L 0	1.5	0.163	1.0	0.030	L 0
	98.07.08	0920	98-05426	94-98-00301									
	98.08.04	0919	98-06894	94-98-00323	55.7	L 0	L 0	1.9	L 0	0.16	1.2	0.014	L 0
	98.08.04	0925	98-06895	94-98-00323	63.0	L 0	L 0	1.8	0.07	0.155	1.2	0.015	L 0
	98.09.13	1120	98-09251	94-98-00401	71.0	L 0	L 0	L 0	L 0	0.14	1.1	0.017	L 0
	98.09.13	1120	98-09252	94-98-00401	56.1	L 0	L 0	L 0	L 0	0.13	1.1	0.012	L 0
SCR EGR 1	98.07.06	0940	98-05172	94-98-00260	9.1	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	0952	98-05173	94-98-00261									
	98.07.06	1010	98-05174	94-98-00262	9.2	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	1020	98-05175	94-98-00263	9.2	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.05	0948	98-07051	94-98-00345	8.6	L 0	L 0	L 0	1.4	L 0	0.9	L 0	L 0
	98.08.05	0952	98-07052	94-98-00346									
	98.08.05	0957	98-07053	94-98-00347	11.0	L 0	L 0	L 0	1.8	L 0	0.8	L 0	L 0
	98.08.05	1001	98-07054	94-98-00348	7.8	L 0	L 0	L 0	0.9	L 0	0.7	L 0	L 0
	98.08.30	1203	98-08574	94-98-00374	6.0	L 0	L 0	0.8	L 0	L 0	0.6	L 0	L 0
	98.08.30	1207	98-08575	94-98-00375									
	98.08.30	1211	98-08576	94-98-00376	9.3	L 0	L 0	0.9	2.0	L 0	0.6	L 0	L 0
	98.08.30	1214	98-08577	94-98-00377	8.3	L 0	L 0	1.0	L 0	L 0	0.6	0.017	L 0
SCR EGR 4	98.07.06	1122	98-05176	94-98-00264	9.4	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	1130	98-05177	94-98-00265									
	98.07.06	1139	98-05178	94-98-00266	8.0	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	1149	98-05179	94-98-00267	9.8	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.05	1100	98-07055	94-98-00350	7.8	L 0	L 0	L 0	L 0	L 0	0.7	L 0	L 0
	98.08.05	1110	98-07056	94-98-00351	7.9	L 0	L 0	L 0	L 0	L 0	0.7	L 0	L 0
	98.08.05	1114	98-07057	94-98-00352									
	98.08.05	1119	98-07058	94-98-00353	10.9	L 0	L 0	L 0	L 0	L 0	0.7	0.013	L 0
	98.08.30	1318	98-08578	94-98-00378	7.4	L 0	L 0	L 0	2.0	L 0	0.7	L 0	L 0
	98.08.30	1321	98-08579	94-98-00379	8.0	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.30	1324	98-08580	94-98-00380									
	98.08.30	1328	98-08581	94-98-00381	6.7	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
SCR EGR 6	98.07.06	1655	98-05184	94-98-00272	12.8	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	1700	98-05185	94-98-00273									
	98.07.06	1706	98-05186	94-98-00274	9.5	L 0	L 0	L 0	L 0	L 0	0.7	L 0	L 0
	98.07.06	1712	98-05187	94-98-00275	9.5	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.08.04	1447	98-06904	94-98-00333	10.3	L 0	0.2	1.5	L 0	L 0	0.06	L 0	L 0
	98.08.04	1453	98-06905	94-98-00334	10.0	L 0	L 0	1.2	L 0	L 0	0.06	L 0	L 0
	98.08.04	1456	98-06906	94-98-00335									
	98.08.04	1501	98-06907	94-98-00336	9.5	L 0	L 0	1.3	L 0	L 0	0.06	L 0	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	AL ug/l as Al	AS ug/l as As	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni
	98.09.03	1125	98-08916	94-98-00390	7.1	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.09.03	1130	98-08917	94-98-00391	6.3	L 0	L 0	L 0	L 0	L 0	0.7	L 0	L 0
	98.09.03	1134	98-08918	94-98-00392	8.0	L 0	L 0	L 0	L 0	L 0	0.7	L 0	L 0
	98.09.03	1136	98-08919	94-98-00393									
SCR NTH 1	98.07.06	1804	98-05191	94-98-00279	34.0	L 0	L 0	L 0	L 0	0.077	0.7	0.023	L 0
	98.07.06	1812	98-05192	94-98-00280									
	98.07.06	1815	98-05193	94-98-00281	31.6	L 0	L 0	L 0	0.7	0.069	0.7	0.027	L 0
	98.07.06	1819	98-05194	94-98-00282	26.7	L 0	L 0	L 0	L 0	0.054	0.7	0.023	L 0
	98.08.04	1608	98-06912	94-98-00341	29.5	L 0	L 0	1.9	L 0	0.068	0.8	0.038	L 0
	98.08.04	1612	98-06913	94-98-00342	26.5	L 0	L 0	1.9	L 0	0.068	0.8	0.038	L 0
	98.08.04	1615	98-06914	94-98-00343									
	98.08.04	1618	98-06915	94-98-00344	27.4	L 0	L 0	1.9	L 0	0.068	0.9	0.041	L 0
	98.09.03	1232	98-08924	94-98-00398	24.4	L 0	L 0	0.5	L 0	L 0	0.8	0.026	L 0
	98.09.03	1238	98-08925	94-98-00399	24.6	L 0	L 0	0.5	L 0	0.062	0.8	0.027	L 0
	98.09.03	1242	98-08926	94-98-00400	16.8	L 0	L 0	L 0	L 0	L 0	0.9	0.017	L 0
SCR NTH 2	98.07.06	1730	98-05188	94-98-00276	24.5	L 0	L 0	L 0	L 0	0.061	0.9	0.021	L 0
	98.07.06	1745	98-05189	94-98-00277	27.0	L 0	L 0	L 0	0.7	0.052	0.7	0.025	L 0
	98.07.06	1749	98-05190	94-98-00278	24.8	L 0	L 0	L 0	L 0	0.051	0.7	0.024	L 0
	98.08.04	1541	98-06908	94-98-00337	20.7	L 0	L 0	1.9	1.9	0.05	0.8	0.06	L 0
	98.08.04	1544	98-06909	94-98-00338	21.1	L 0	L 0	2.0	L 0	0.06	0.8	0.059	L 0
	98.08.04	1447	98-06910	94-98-00339									
	98.08.04	1550	98-06911	94-98-00340	26.6	L 0	L 0	2.0	L 0	0.65	0.8	0.065	L 0
	98.09.03	1211	98-08920	94-98-00394	14.2	L 0	L 0	1.0	2.3	0.063	0.8	0.022	L 0
	98.09.03	1214	98-08921	94-98-00395	14.8	L 0	L 0	0.6	L 0	0.051	0.8	0.025	L 0
	98.09.03	1216	98-08922	94-98-00396									
	98.09.03	1219	98-08923	94-98-00397	16.5	L 0	L 0	0.6	L 0	L 0	0.8	0.029	L 0
SCR SKIF 1	98.07.07	1423	98-05328	94-98-00295	6.9	L 0	L 0	L 0	3.6	L 0	0.4	L 0	L 0
	98.07.07	1437	98-05329	94-98-00296	7.2	L 0	L 0	L 0	0.6	L 0	0.4	L 0	L 0
	98.07.07	1440	98-05330	94-98-00297									
	98.07.07	1450	98-05331	94-98-00298	8.6	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.08.05	1502	98-07063	94-98-00357	5.8	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.08.05	1505	98-07064	94-98-00358	5.1	L 0	L 0	L 0	L 0	L 0	0.4	L 0	L 0
	98.08.05	1510	98-07065	94-98-00359	5.7	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.08.05	1515	98-07066	94-98-00360									
	98.08.05	1526	98-07067	94-98-00361	7.9	L 0	L 0	L 0	0.9	L 0	0.5	0.03	L 0
	98.09.03	0912	98-08912	94-98-00386	3.2	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.09.03	0919	98-08913	94-98-00387	4.5	L 0	L 0	L 0	1.5	L 0	0.4	L 0	L 0
	98.09.03	0920	98-08914	94-98-00388									
	98.09.03	0926	98-08915	94-98-00389	3.4	L 0	L 0	L 0	1.0	L 0	0.4	L 0	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	AL ug/l as Al	AS ug/l as As	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni
SCR SPED 1	98.07.06	1320	98-05180	94-98-00268	26.1	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.07.06	1325	98-05181	94-98-00269									
	98.07.06	1335	98-05182	94-98-00270	23.1	L 0	L 0	L 0	0.8	L 0	0.5	0.011	L 0
	98.07.06	1346	98-05183	94-98-00271	33.3	L 0	L 0	L 0	L 0	L 0	0.5	0.022	L 0
	98.08.05	1252	98-07059	94-98-00353	16.5	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.05	1250	98-07060	94-98-00354									
	98.08.05	1300	98-07061	94-98-00355	20.0	L 0	L 0	L 0	1.3	L 0	0.7	0.01	L 0
	98.08.05	1356	98-07062	94-98-00354	23.6	L 0	L 0	L 0	1.0	L 0	0.7	0.049	L 0
	98.08.30	1446	98-08582	94-98-00382	15.8	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.30	1455	98-08583	94-98-00383									
	98.08.30	1456	98-08584	94-98-00384	13.9	L 0	L 0	L 0	L 0	L 0	0.6	L 0	L 0
	98.08.30	1503	98-08585	94-98-00385	21.9	L 0	L 0	L 0	0.7	0.091	0.6	0.104	L 0
SCR SPED 5	98.07.07	1200	98-05324	94-98-00291	29.7	L 0	L 0	L 0	L 0		0.5	L 0	L 0
	98.07.07	1205	98-05325	94-98-00292									
	98.07.07	1211	98-05326	94-98-00293	33.6	L 0	L 0	L 0	L 0	L 0	0.5	0.015	L 0
	98.07.07	1220	98-05327	94-98-00294	37.0	L 0	L 0	L 0	L 0	L 0	0.4	0.018	L 0
	98.08.03	1207	98-06808	94-98-00315	22.8	L 0	L 0	L 0	L 0	L 0	0.4	0.013	L 0
	98.08.03	1211	98-06809	94-98-00316									
	98.08.03	1217	98-06810	94-98-00317	22.2	L 0	L 0	L 0	0.08	L 0	0.5	0.013	L 0
	98.08.03	1223	98-06811	94-98-00318	22.8	L 0	L 0	L 0	1.8	0.051	0.5	0.026	L 0
	98.08.26	1245	98-08386	94-98-00370	19.2	L 0	L 0	1.1	L 0	L 0	0.5	L 0	L 0
	98.08.26	1247	98-08387	94-98-00371									
	98.08.26	1251	98-08388	94-98-00372	24.2	L 0	L 0	1.1	L 0	L 0	0.6	0.016	L 0
	98.08.26	1259	98-08389	94-98-00373	31.0	L 0	L 0	1.6	1.1	0.144	0.4	0.231	L 0
SCR SPED 6	98.07.07	0947	98-05316	94-98-00283	25.9	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.07.07	0951	98-05317	94-98-00284									
	98.07.07	1003	98-05318	94-98-00285	25.8	L 0	L 0	L 0	L 0	L 0	0.5	L 0	L 0
	98.07.07	1012	98-05319	94-98-00286	29.7	L 0	L 0	L 0	L 0	L 0	0.5	0.024	L 0
	98.08.03	1057	98-06804	94-98-00311	17.1	L 0	L 0	L 0	L 0	L 0	0.5	0.012	L 0
	98.08.03	1104	98-06805	94-98-00312	17.3	L 0	L 0	L 0	4.0	L 0	0.5	L 0	L 0
	98.08.03	1107	98-06806	94-98-00313									
	98.08.03	1114	98-06807	94-98-00314	22.2	L 0	L 0	0.6	1.2	L 0	0.5	0.014	L 0
	98.08.26	1004	98-08378	94-98-00362	18.0	L 0	L 0	1.3	L 0	L 0	0.6	L 0	L 0
	98.08.26	1006	98-08379	94-98-00363									
	98.08.26	1010	98-08380	94-98-00364	16.8	L 0	L 0	1.1	L 0	L 0	0.6	L 0	L 0
	98.08.26	1013	98-08381	94-98-00365	23.0	L 0	L 0	1.2	L 0	L 0	0.6	0.013	L 0
SCR SPED 7	98.07.07	1107	98-05320	94-98-00287	39.8	L 0	L 0	L 0	L 0		0.4	L 0	L 0
	98.07.07	1111	98-05321	94-98-00288									
	98.07.07	1118	98-05322	94-98-00289	41.9	L 0	L 0	L 0	L 0	L 0	0.4	0.026	L 0
	98.07.07		98-05323	94-98-00290	42.5	L 0	L 0	L 0	0.8	L 0	0.4	0.043	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	AL ug/l as Al	AS ug/l as As	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni
	98.08.03	1400	98-06812	94-98-00319	26.4	L 0	L 0	L 0	0.9	L 0	0.3	L 0	L 0
	98.08.03	1403	98-06813	94-98-00320									
	98.08.03	1409	98-06814	94-98-00321	30.4	L 0	L 0	0.6	L 0	L 0	0.4	0.015	L 0
	98.08.03	1415	98-06815	94-98-00322	37.1	L 0	L 0	1.0	L 0	0.068	0.4	0.087	L 0
	98.08.26	1132	98-08382	94-98-00366	20.0	L 0	L 0	1.0	0.8	L 0	0.5	0.012	L 0
	98.08.26	1135	98-08383	94-98-00367	21.5	L 0	L 0	0.9	L 0	L 0	0.4	0.012	L 0
	98.08.26	1138	98-08384	94-98-00368									
	98.08.26	1140	98-08385	94-98-00369	23.7	L 0	L 0	1.0	1.1	L 0	0.5	0.026	L 0
SCR WAUK 1	98.07.08	1158	98-05431	94-98-00306	89.7	L 0	L 0	L 0	L 0	0.12	0.3	0.025	L 0
	98.07.08	1205	98-05432	94-98-00307	90.3	L 0	L 0	L 0	L 0	0.122	0.4	0.025	L 0
	98.07.08	1210	98-05433	94-98-00308									
	98.07.08	1158	98-05434	94-98-00309	91.4	L 0	L 0	L 0	L 0	0.163	0.4	0.036	L 0
	98.07.08	1225	98-05435	94-98-00310	108.0	L 0	L 0	L 0	0.9	0.286	0.4	0.151	L 0
	98.08.04	1139	98-06900	94-98-00329	59.8	L 0	L 0	0.7	1	0.142	0.4	0.015	L 0
	98.08.04	1145	98-06901	94-98-00330									
	98.08.04	1148	98-06902	94-98-00331	60.1	L 0	L 0	0.6	2.4	0.135	0.4	0.015	L 0
	98.08.04	1154	98-06903	94-98-00332	60.7	L 0	0.2	0.7	1	0.167	0.4	0.023	L 0
	98.09.13	1403	98-09257	94-98-00406	48.1	L 0	L 0	L 0	0.7	0.207	0.4	0.054	L 0
	98.09.13	1406	98-09258	94-98-00407									
	98.09.13	1410	98-09259	94-98-00408	49.0	L 0	L 0	L 0	1.6	0.216	0.5	0.056	L 0
	98.09.13	1432	98-09260	94-98-00409	49.0	L 0	L 0	1.0	0.7	0.214	0.5	0.057	L 0
SCR WAUK 2	98.07.08	1118	98-05427	94-98-00302	84.0	L 0	L 0	L 0	L 0	0.086	0.3	0.026	L 0
	98.07.08	1125	98-05428	94-98-00303	84.9	L 0	L 0	L 0	L 0	0.097	0.3	0.028	L 0
	98.07.08	1131	98-05429	94-98-00304	89.8	L 0	L 0	L 0	0.8	0.101	0.3	0.034	L 0
	98.07.08	1125	98-05430	94-98-00305									
	98.08.04	1222	98-06896	94-98-00325	56.9	L 0	L 0	L 0	L 0	0.117	0.5	0.014	L 0
	98.08.04	1225	98-06897	94-98-00326	57.3	L 0	L 0	L 0	L 0	0.106	0.4	0.014	L 0
	98.08.04	1230	98-06898	94-98-00327									
	98.08.04	1238	98-06899	94-98-00328	60.1	L 0	L 0	L 0	0.6	0.096	0.4	0.016	L 0
	98.09.13	1432	98-09253	94-98-00402	61.4	L 0	L 0	L 0	L 0	0.14	0.4	0.250	L 0
	98.09.13	1435	98-09254	94-98-00403	56.8	L 0	L 0	L 0	0.6	0.139	0.4	0.230	L 0
	98.09.13	1439	98-09255	94-98-00404									
	98.09.13	1441	98-09256	94-98-00405	57.6	L 0	L 0	L 0	L 0	0.144	0.4	0.240	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	PB ug/l as Pb	SB ug/l as Sb	ZN mg/l as Zn
SCR CNOS 1	98.07.08	0909	98-05424	94-98-00299	L 0	L 0	L 0
	98.07.08	0916	98-05425	94-98-00300	2.0	L 0	L 0
	98.07.08	0920	98-05426	94-98-00301			
	98.08.04	0919	98-06894	94-98-00323	L 0	L 0	L 0
	98.08.04	0925	98-06895	94-98-00323	L 0	L 0	L 0
	98.09.13	1120	98-09251	94-98-00401	L 0	L 0	L 0
	98.09.13	1120	98-09252	94-98-00401	L 0	L 0	L 0
SCR EGR 1	98.07.06	0940	98-05172	94-98-00260	L 0	L 0	L 0
	98.07.06	0952	98-05173	94-98-00261			
	98.07.06	1010	98-05174	94-98-00262	L 0	L 0	L 0
	98.07.06	1020	98-05175	94-98-00263	L 0	L 0	L 0
	98.08.05	0948	98-07051	94-98-00345	L 0	L 0	L 0
	98.08.05	0952	98-07052	94-98-00346			
	98.08.05	0957	98-07053	94-98-00347	1.7	L 0	L 0
	98.08.05	1001	98-07054	94-98-00348	L 0	L 0	L 0
	98.08.30	1203	98-08574	94-98-00374	L 0	L 0	L 0
	98.08.30	1207	98-08575	94-98-00375			
	98.08.30	1211	98-08576	94-98-00376	1.2	L 0	0.017
	98.08.30	1214	98-08577	94-98-00377	L 0	L 0	L 0
SCR EGR 4	98.07.06	1122	98-05176	94-98-00264	L 0	L 0	L 0
	98.07.06	1130	98-05177	94-98-00265			
	98.07.06	1139	98-05178	94-98-00266	L 0	L 0	0.028
	98.07.06	1149	98-05179	94-98-00267	L 0	L 0	L 0
	98.08.05	1100	98-07055	94-98-00350	L 0	L 0	L 0
	98.08.05	1110	98-07056	94-98-00351	L 0	L 0	L 0
	98.08.05	1114	98-07057	94-98-00352			
	98.08.05	1119	98-07058	94-98-00353	L 0	L 0	L 0
	98.08.30	1318	98-08578	94-98-00378	L 0	L 0	L 0
	98.08.30	1321	98-08579	94-98-00379	L 0	L 0	L 0
	98.08.30	1324	98-08580	94-98-00380			
	98.08.30	1328	98-08581	94-98-00381	L 0	L 0	L 0
SCR EGR 6	98.07.06	1655	98-05184	94-98-00272	L 0	L 0	L 0
	98.07.06	1700	98-05185	94-98-00273			
	98.07.06	1706	98-05186	94-98-00274	L 0	L 0	L 0
	98.07.06	1712	98-05187	94-98-00275	L 0	L 0	L 0
	98.08.04	1447	98-06904	94-98-00333	L 0	L 0	L 0
	98.08.04	1453	98-06905	94-98-00334	L 0	L 0	L 0
	98.08.04	1456	98-06906	94-98-00335			
	98.08.04	1501	98-06907	94-98-00336	L 0	L 0	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	PB ug/l as Pb	SB ug/l as Sb	ZN mg/l as Zn
	98.09.03	1125	98-08916	94-98-00390	L 0	L 0	L 0
	98.09.03	1130	98-08917	94-98-00391	L 0	L 0	L 0
	98.09.03	1134	98-08918	94-98-00392	L 0	L 0	L 0
	98.09.03	1136	98-08919	94-98-00393			
SCR NTH 1	98.07.06	1804	98-05191	94-98-00279	L 0	L 0	L 0
	98.07.06	1812	98-05192	94-98-00280			
	98.07.06	1815	98-05193	94-98-00281	L 0	L 0	L 0
	98.07.06	1819	98-05194	94-98-00282	L 0	L 0	L 0
	98.08.04	1608	98-06912	94-98-00341	L 0	L 0	L 0
	98.08.04	1612	98-06913	94-98-00342	L 0	L 0	L 0
	98.08.04	1615	98-06914	94-98-00343			
	98.08.04	1618	98-06915	94-98-00344	L 0	L 0	L 0
	98.09.03	1232	98-08924	94-98-00398	L 0	L 0	L 0
	98.09.03	1238	98-08925	94-98-00399	L 0	L 0	L 0
	98.09.03	1242	98-08926	94-98-00400	L 0	L 0	L 0
SCR NTH 2	98.07.06	1730	98-05188	94-98-00276	L 0	L 0	L 0
	98.07.06	1745	98-05189	94-98-00277	L 0	L 0	L 0
	98.07.06	1749	98-05190	94-98-00278	L 0	L 0	L 0
	98.08.04	1541	98-06908	94-98-00337	L 0	L 0	L 0
	98.08.04	1544	98-06909	94-98-00338	L 0	L 0	L 0
	98.08.04	1447	98-06910	94-98-00339			
	98.08.04	1550	98-06911	94-98-00340	L 0	L 0	L 0
	98.09.03	1211	98-08920	94-98-00394	L 0	L 0	L 0
	98.09.03	1214	98-08921	94-98-00395	L 0	L 0	L 0
	98.09.03	1216	98-08922	94-98-00396			
	98.09.03	1219	98-08923	94-98-00397	L 0	L 0	L 0
SCR SKIF 1	98.07.07	1423	98-05328	94-98-00295	L 0	L 0	L 0
	98.07.07	1437	98-05329	94-98-00296	L 0	L 0	L 0
	98.07.07	1440	98-05330	94-98-00297			
	98.07.07	1450	98-05331	94-98-00298	L 0	L 0	L 0
	98.08.05	1502	98-07063	94-98-00357	L 0	L 0	L 0
	98.08.05	1505	98-07064	94-98-00358	L 0	L 0	L 0
	98.08.05	1510	98-07065	94-98-00359	L 0	L 0	L 0
	98.08.05	1515	98-07066	94-98-00360			
	98.08.05	1526	98-07067	94-98-00361	L 0	L 0	L 0
	98.09.03	0912	98-08912	94-98-00386	L 0	L 0	L 0
	98.09.03	0919	98-08913	94-98-00387	21.1	L 0	L 0
	98.09.03	0920	98-08914	94-98-00388			
	98.09.03	0926	98-08915	94-98-00389	L 0	L 0	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	PB ug/l as Pb	SB ug/l as Sb	ZN mg/l as Zn
SCR SPED 1	98.07.06	1320	98-05180	94-98-00268	L 0	L 0	L 0
	98.07.06	1325	98-05181	94-98-00269			
	98.07.06	1335	98-05182	94-98-00270	L 0	L 0	L 0
	98.07.06	1346	98-05183	94-98-00271	L 0	L 0	L 0
	98.08.05	1252	98-07059	94-98-00353	L 0	L 0	L 0
	98.08.05	1250	98-07060	94-98-00354			
	98.08.05	1300	98-07061	94-98-00355	L 0	L 0	L 0
	98.08.05	1356	98-07062	94-98-00354	L 0	L 0	L 0
	98.08.30	1446	98-08582	94-98-00382	L 0	L 0	L 0
	98.08.30	1455	98-08583	94-98-00383			
	98.08.30	1458	98-08584	94-98-00384	L 0	L 0	L 0
	98.08.30	1503	98-08585	94-98-00385	L 0	L 0	L 0
SCR SPED 5	98.07.07	1200	98-05324	94-98-00291	L 0	L 0	L 0
	98.07.07	1205	98-05325	94-98-00292			
	98.07.07	1211	98-05326	94-98-00293	L 0	L 0	L 0
	98.07.07	1220	98-05327	94-98-00294	L 0	L 0	L 0
	98.08.03	1207	98-06808	94-98-00315	L 1.0	L 0	0.055
	98.08.03	1211	98-06809	94-98-00316			
	98.08.03	1217	98-06810	94-98-00317	L 0	L 0	L 0
	98.08.03	1223	98-06811	94-98-00318	L 0	L 0	0.019
	98.08.26	1245	98-08386	94-98-00370	L 0	L 0	L 0
	98.08.26	1247	98-08387	94-98-00371			
	98.08.26	1251	98-08388	94-98-00372	L 0	L 0	L 0
	98.08.26	1259	98-08389	94-98-00373	L 0	L 0	L 0
SCR SPED 6	98.07.07	0947	98-05316	94-98-00283	L 0	L 0	L 0
	98.07.07	0951	98-05317	94-98-00284			
	98.07.07	1003	98-05318	94-98-00285	L 0	L 0	0.012
	98.07.07	1012	98-05319	94-98-00286	L 0	L 0	L 0
	98.08.03	1057	98-06804	94-98-00311	L 0	L 0	L 0
	98.08.03	1104	98-06805	94-98-00312	1.6	L 0	0.011
	98.08.03	1107	98-06806	94-98-00313			
	98.08.03	1114	98-06807	94-98-00314	L 0	L 0	0.019
	98.08.26	1004	98-08378	94-98-00362	L 0	L 0	L 0
	98.08.26	1006	98-08379	94-98-00363			
	98.08.26	1010	98-08380	94-98-00364	L 0	L 0	L 0
	98.08.26	1013	98-08381	94-98-00365	L 0	L 0	0.01
SCR SPED 7	98.07.07	1107	98-05320	94-98-00287	L 0	L 0	L 0
	98.07.07	1111	98-05321	94-98-00288			
	98.07.07	1118	98-05322	94-98-00289	L 0	L 0	L 0
	98.07.07		98-05323	94-98-00290	L 0	L 0	L 0

Appendix 5b (cont.). 1998 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	PB ug/l as Pb	SB ug/l as Sb	ZN mg/l as Zn
	98.08.03	1400	98-06812	94-98-00319	L 0	L 0	L 0
	98.08.03	1403	98-06813	94-98-00320			
	98.08.03	1409	98-06814	94-98-00321	L 0	L 0	0
	98.08.03	1415	98-06815	94-98-00322	L 0	L 0	L 0
	98.08.26	1132	98-08382	94-98-00366	L 0	L 0	L 0
	98.08.26	1135	98-08383	94-98-00367	L 0	L 0	0.012
	98.08.26	1138	98-08384	94-98-00368			
	98.08.26	1140	98-08385	94-98-00369	L 0	L 0	L 0
SCR WAUK 1	98.07.08	1158	98-05431	94-98-00306	L 0	L 0	L 0
	98.07.08	1205	98-05432	94-98-00307	L 0	L 0	L 0
	98.07.08	1210	98-05433	94-98-00308			
	98.07.08	1156	98-05434	94-98-00309	L 0	L 0	L 0
	98.07.08	1225	98-05435	94-98-00310	1.0	L 0	0.027
	98.08.04	1139	98-06900	94-98-00329	L 0	L 0	L 0
	98.08.04	1145	98-06901	94-98-00330			
	98.08.04	1148	98-06902	94-98-00331	1.1	L 0	L 0
	98.08.04	1154	98-06903	94-98-00332	L 0	L 0	L 0
	98.09.13	1403	98-09257	94-98-00406	L 0	L 0	L 0
	98.09.13	1406	98-09258	94-98-00407			
	98.09.13	1410	98-09259	94-98-00408	L 0	L 0	L 0
	98.09.13	1432	98-09260	94-98-00409	L 0	L 0	L 0
SCR WAUK 2	98.07.08	1118	98-05427	94-98-00302	L 0	L 0	L 0
	98.07.08	1125	98-05428	94-98-00303	1.0	L 0	L 0
	98.07.08	1131	98-05429	94-98-00304	L 0	L 0	L 0
	98.07.08	1125	98-05430	94-98-00305			
	98.08.04	1222	98-06896	94-98-00325	L 0	L 0	L 0
	98.08.04	1225	98-06897	94-98-00326	L 1.0	L 0	L 0
	98.08.04	1230	98-06898	94-98-00327			
	98.08.04	1238	98-06899	94-98-00328	L 0	L 0	0.14
	98.09.13	1432	98-09253	94-98-00402	L 0	L 0	0.39
	98.09.13	1435	98-09254	94-98-00403	L 0	L 0	L 0
	98.09.13	1439	98-09255	94-98-00404			
	98.09.13	1441	98-09256	94-98-00405	L 0	L 0	L 0

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Water Temp as C	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl A ug/l as Chl A	Cl mg/l as Cl-	Color as color units
SC-FIFTH1	Fifth Lake - Station #1	99/06/28	1810	199905177	94/00489	0.2	24.5	3.72	1.79		0.92	15
		99/06/28	1825	199905178	94/00490	5.3	22.5			Q 2.8		
		99/06/28	1815	199905179	94/00491	4.0	22.5	3.66	1.74		0.928	10
		99/06/28	1830	199905180	94/00492	7.5	20.5	3.6	1.72		0.874	15
		99/07/19	1218	199906665	94/00535	0.2	24.4	4.54	2.36		0.786	5
		99/07/19	1220	199906666	94/00536	5.3	22			Q 2.1		
		99/07/19	1225	199906667	94/00537	5.5	21.4	3.94	2.16		0.805	5
		99/07/19	1230	199906668	94/00538	10.8	20.7	4.54	2.06		0.784	10
		99/08/29	1200	199909301	94/00682	0.2	22.9	3.79	2.02		0.772	0
		99/08/29	1208	199909302	94/00683	6.5	21.8			Q 3.2		
		99/08/29	1205	199909303	94/00684	6.2	21.8	3.44	2.01		0.794	5
		99/08/29	1214	199909304	94/00685	12.0	12	6.97	2.39		0.904	15
SC-GFF1	Grand Falls Flowage - Station #1	99/06/22	1320	199904935	94/00474	0.2	24.5	5.1	2.66		1.65	20
		99/06/22	1330	199904936	94/00475	3.0	21			Q 1.6		
		99/06/22	1340	199904937	94/00476	3.0	21	4.92	2.64		1.7	30
		99/06/22	1350	199904938	94/00477	5.0	20	4.8	2.74		1.6	30
		99/08/26	1320	199909259	94/00655	0.2	22.8	5.58	2.63		1.58	5
		99/08/26	1330	199909260	94/00656	5.0	21			Q 4.4		
		99/08/26	1335	199909261	94/00657	3.0	21.5	5.72	2.31		1.53	5
		99/08/26	1340	199909262	94/00658	5.0	21	5.62	2.31		1.48	10
		99/07/28	1245	199907458	94/00580	0.2	24.9	6.31	2.5		1.56	10
		99/07/28	1250	199907459	94/00581	4.0	22.8			Q 2.8		
		99/07/28	1255	199907460	94/00582	2.8	23	6.5	2.44		1.61	10
		99/07/28	1300	199907461	94/00583	4.5	22	5.76	2.71		1.58	10
SC-GFF2	Grand Falls Flowage - Station #2	99/06/22	1615	199904919	94/00454	0.2	24.2	6.95	3.46		1.53	30
		99/06/22	1630		94/00455	3.0	21.2					
		99/06/22	1640	199904920	94/00456	5.0	20	6.9	3.56		1.49	30
		99/06/22	1645	199904921	94/00457	9.0	13.2	7.84	3.83		1.5	50
		99/07/28	1320	199907454	94/00584	0.2	24.6	7.63	3.45		1.38	10
		99/07/28	1325	199907455	94/00585	4.5	22.5			Q 1.3		
		99/07/28	1330	199907456	94/00586	5.0	22	8.53	3.46		1.42	15
		99/07/28	1340	199907457	94/00587	9.0	15.5	13.8	4.05		1.62	50
		99/08/26	1410	199909263	94/00659	0.2	24	6.7	3.11		1.37	15
		99/08/26	1420	199909264	94/00660	5.5	21.5			Q 2.2		
		99/08/26	1425	199909265	94/00661	5.0	21.5	6.82	2.98		1.27	10
		99/08/26	1430	199909266	94/00662	9.0	17.5	8.56	3.27		1.4	20

L = below limit of quantification Q = not a quality assured parameter T = trace

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Location	Date y/m/d	Time from ADT	Lab #	Field #	Sample depth as m	Water Temp as C	Alk-G mg/l as CaCO3	Ca-D ug/l as Ca	Chl A ug/l as Chl A	Cl mg/l as Cl-	Color as color units
SC-MODS1	Modsley Lake - Station #1	99/07/11	1905	199905988	94/00515	0.2	21.1	2.95	2.09		1.49	50
		99/07/11	1922	199905989	94/00516	2.7	21.1			Q 3.7		
		99/07/11	1910	199905990	94/00517	4.0	21.1	2.98	2.07		1.58	50
		99/07/11	1918	199905991	94/00518	8.0	21.1	3.06	2.04		1.47	50
SC-WD1	Woodland Flowage - Station #1	99/06/23	0830	199904903	94/00437	0.2	23.5	5.9	2.91		1.68	40
		99/06/23	0835	199904904	94/00438	2.6	23			Q 4.3		
		99/06/23	0840	199904905	94/00439	2.9	22.5	5.78	3		1.6	20
		99/06/23	0845	199904906	94/00440	5.3	21.5	6.06	3		1.56	40
		99/07/18	1410	199906583	94/00555	0.2	27.2	7.11	3.18		1.68	15
		99/07/18	1412	199906584	94/00556	2.6	24			Q 3.7		
		99/07/18	1417	199906585	94/00557	2.9	24	7.41	3.18		1.7	20
		99/07/18	1419	199906586	94/00558	5.8	22	7.32	3.05		1.67	20
		99/08/22	1125	199908880	94/00623	0.2	22	7.71	3.14		1.44	20
		99/08/22	1128	199908881	94/00624	4.2	22			Q 2.4		
		99/08/22	1130	199908882	94/00625	3.0	22	7.59	3.1		1.44	10
		99/08/22	1135	199908883	94/00626	5.5	22	7.57	3.09		1.36	10
SC-WD2	Woodland Flowage - Station #2	99/06/23	0720	199904899	94/00433	0.2	23	6.5	3.05		1.59	40
		99/06/23	0725	199904900	94/00434	2.6	23			Q 3.8		
		99/06/23	0730	199904901	94/00435	2.0	23	5.64	2.97		1.69	40
		99/06/23	0740	199904902	94/00436	3.5	22.5	5.84	2.94		1.65	30
		99/07/18	1300	199906571	94/00523	0.2	26.8	5.67	3.51		1.66	20
		99/07/18	1308	199906572	94/00524	2.9	24.1			Q 3		
		99/07/18	1305	199906573	94/00525	2.6	24.6	5.24	3.05		1.67	20
		99/07/18	1310	199906574	94/00526	5.0	22	6.19	3.22		1.67	20
		99/08/22	1210	199908877	94/00619	0.2	22	7.6	3.15		1.37	10
		99/08/22	1215	199908878	94/00621	2.7	21.8	7.53	3.13		1.32	15
		99/08/22	1220	199908879	94/00622	5.2	21.8	7.49	3.14		1.33	15
SC-SIXTH1	Sixth Lake - Station #1	99/08/29	1045	199909305	94/00686	0.2	22.9	3.5	1.97		0.827	5
		99/08/29	1055	199909306	94/00687	5.3	20.9			Q 2.9		
		99/08/29	1050	199909307	94/00688	3	22.7	3.66	1.99		0.774	5
		99/08/29	1058	199909308	94/00689	5.7	20.6	3.47	1.98		0.724	5
SC-BLTN1	Bolton Lake - Station #1	99/07/19	1427	199906669	94/00539	0.2	24.6	5.56	2.52		0.658	5
		99/07/19	1437	199906670	94/00540	5.5	22.3			Q 2.9		
		99/07/19	1432	199906671	94/005401	3.0	24.5	5.64	2.48		0.698	5
		99/07/19	1440	199906672	94/00542	5.5	22.3	6.06	2.56		0.657	0
		99/08/29	1348	199909309	94/00671	0.2	22.9	5.44	2.54		0.789	0
		99/08/29	1355	199909310	94/00673	3.0	23	5.46	2.56		0.697	5
		99/08/29	1358	199909311	94/00674	5.7	21.7	4.87	2.58		0.672	5

L = below limit of quantification. Q = not a quality assured parameter. T = trace

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	Cond usie/cm	Dissolved Oxygen mg/l	TOC mg/l as C	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P
SC-FIFTH1	99/06/28	1810	199905177	94/00489	21.9	7.0	4.71	0.323	1.08	L 0	7.00	3.4	5.3	L 0
	99/06/28	1825	199905178	94/00490		6.8							5.3	
	99/06/28	1815	199905179	94/00491	21.9	7.0	4.91	0.301	1.05	L 0	6.99	3.08	5.3	0.005
	99/06/28	1830	199905180	94/00492	22.0	5.7	4.77	0.283	1.05	L 0	6.94	3.1	5.3	0.005
	99/07/19	1218	199906665	94/00535	24.3	7.8	4.39	0.364	1.17	L 0	7.09	2.9	5.3	L 0
	99/07/19	1220		94/00536		7.7				L			5.3	L
	99/07/19	1225	199906667	94/00537	23.7	7.3	4.41	0.374	1.12	L 0	7.01	2.86	5.3	L 0
	99/07/19	1230	199906668	94/00538	23.9	5.8	4.14	0.367	1.05	L 0	6.90	2.85	5.3	L 0
	99/08/29	1200	199909301	94/00682	22.3	7.1	4.59	0.394	1.20	L 0	6.70	2.42	6.5	L 0
	99/08/29	1208		94/00683		6.7							6.5	
	99/08/29	1205	199909303	94/00684	22.1	6.6	5.06	0.388	1.20	L 0	6.68	2.25	6.5	L 0
	99/08/29	1214	199909304	94/00685	27.6	0.1	4.53	0.360	1.14	L 0	6.61	2.0	6.5	L 0
SC-GFF1	99/06/22	1320	199904935	94/00474	28.3	7.9	5.97	0.345	1.68	L 0	7.04	2.7	3	L 0
	99/06/22	1330		94/00475		7.4							3	
	99/06/22	1340	199904937	94/00476	28.7	7.4	6.34	0.330	1.68	L 0	6.99	2.74	3	L 0
	99/06/22	1350	199904938	94/00477	28.6	6.2	6.12	0.331	1.73	L 0	6.98	2.67	3	L 0
	99/08/26	1320	199909259	94/00655	28.8	8.0	5.23	0.408	1.78	L 0	6.81	2.8	5.3	L 0
	99/08/26	1330		94/00656		7.2							5.3	
	99/08/26	1335	199909261	94/00657	28.9	8.0	5.11	0.333	1.58	L 0	6.78	2.48	5.3	L 0
	99/08/26	1340	199909262	94/00658	28.8	7.2	5.42	0.335	1.60	L 0	6.89	2.45	5.3	L 0
	99/07/28	1245	199907458	94/00580	28.9	7.5	6.62	0.361	1.63	L 0	7.04	2.86	4	L 0
	99/07/28	1250		94/00581		6.6							4	
	99/07/28	1255	199907460	94/00582	29.2	6.7	6.11	0.359	1.60	L 0	6.98	2.98	4	L 0
	99/07/28	1300	199907461	94/00583	29.8	5.2	6.81	0.364	1.73	L 0	7.02	2.81	4	L 0
SC-GFF2	99/06/22	1615	199904919	94/00454	31.4	8.1	6.60	0.303	1.67	L 0	7.15	2.61	3.1	L 0
	99/06/22	1630		94/00455		7.8							3.1	
	99/06/22	1640	199904920	94/00456	31.7	6.8	6.30	0.294	1.66	L 0	7.1	2.56	3.1	L 0
	99/06/22	1645	199904921	94/00457	34.3	0.8	7.55	0.307	1.60	L 0	7.02	2.43	3.1	0.005
	99/07/28	1320	199907454	94/00584	31.5	7.7	5.91	0.311	1.49	L 0	7.11	2.68	4.5	L 0
	99/07/28	1325		94/00585		6.8							4.5	
	99/07/28	1330	199907456	94/00586	32.2	5.3	6.31	0.320	1.48	L 0	6.94	2.53	4.5	0.005
	99/07/28	1340	199907457	94/00587	43.5	0.1	8.41	0.310	1.54	0	6.97	2.28	4.5	0.011
	99/08/26	1410	199909263	94/00659	32.2	8.1	4.93	0.295	1.42	L 0	7.12	2.36	5.5	L 0
	99/08/26	1420		94/00660		7.5							5.5	
	99/08/26	1425	199909265	94/00661	31	7.7	5.12	0.273	1.32	L 0	6.83	2.47	5.5	L 0
	99/08/26	1430	199909266	94/00662	34.3	1.7	5.38	0.331	1.51	L 0	6.59	2.24	5.5	0.007

L = below limit of quantification Q = not a quality assured parameter T = trace.

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	Cond us/e/cm	Dissolved Oxygen mg/l	TOC mg/l as C	K mg/l as K	Na mg/l as Na	NOx mg/l as N	pH	SO4 mg/l as SO4	Secchi as m	TP-L mg/l as P
SC-MODS1	99/07/11	1905	199905988	94/00515	22.5	7.7	8.71	0.213	1.58	L 0	6.64	2.2	2.7	0.008
	99/07/11	1922		94/00516		7.5							2.7	
	99/07/11	1910	199905990	94/00517	22.4	7.4	9.14	0.218	1.60	L 0	6.62	2.19	2.7	0.008
	99/07/11	1918	199905991	94/00518	22.6	7.3	8.99	0.219	1.60	L 0	6.63	2.15	2.7	0.01
SC-WD1	99/06/23	0830	199904903	94/00437	30.8	6.9	7.32	0.294	1.56	L 0	7.11	2.59	2.6	0.005
	99/06/23	0835		94/00438		6.6							2.6	
	99/06/23	0840	199904905	94/00439	31	6.1	7.07	0.307	1.60	L 0	7.10	2.53	2.6	L 0
	99/06/23	0845	199904906	94/00440	31.3	4.4	6.88	0.299	1.57	L 0	7.11	2.51	2.6	L 0
	99/07/18	1410	199906583	94/00555	32.7	12.8	6.09	0.317	1.80	L 0	7.24	2.45	2.6	0.005
	99/07/18	1412		94/00556		10.0							2.6	
	99/07/18	1417	199906585	94/00557	32.7	9.4	6.16	0.347	1.85	L 0	7.23	2.47	2.6	0.006
	99/07/18	1419	199906586	94/00558	32.9	3.6	6.25	0.337	1.71	L 0	7.12	2.43	2.6	0.005
	99/08/22	1125	199908880	94/00623	31.1	8.2	5.16	0.273	1.58	L 0	7.17	2.59	4.2	L 0
	99/08/22	1128		94/00624		8.2							4.2	
	99/08/22	1130	199908882	94/00625	30.9	8.2	5.28	0.256	1.57	L 0	7.18	2.68	4.2	L 0
	99/08/22	1135	199908883	94/00626	30.9	8.2	5.09	0.253	1.57	L 0	7.16	2.46	4.2	L 0
SC-WD2	99/06/23	0720	199904899	94/00433	30.8	6.7	7.58	0.306	1.63	L 0	7.05	2.52	2.6	0.008
	99/06/23	0725		94/00434		6.7							2.6	
	99/06/23	0730	199904901	94/00435	30.7	6.7	7.37	0.298	1.60	L 0	7.06	2.52	2.6	0.005
	99/06/23	0740	199904902	94/00436	30.8	5.8	7.81	0.306	1.59	L 0	7.07	2.56	2.6	0.005
	99/07/18	1300	199906571	94/00523	32.1	11.5	6.25	0.342	1.84	L 0	7.14	2.5	2.9	0.005
	99/07/18	1306		94/00524		9.3							2.9	
	99/07/18	1305	199906573	94/00525	31.9	7.9	6.53	0.336	1.75	L 0	7.23	2.65	2.9	0.006
	99/07/18	1310	199906574	94/00526	32.7	5.5	6.51	0.340	1.78	L 0	7.14	2.49	2.9	L 0
	99/08/22	1210	199908877	94/00619	30.8	8.4	5.13	0.267	1.70	L 0	7.16	3.21	4.5	L 0
	99/08/22	1215	199908878	94/00621	30.6	8.2	4.75	0.264	1.55	L 0	7.15	2.62	4.5	L 0
	99/08/22	1220	199908879	94/00622	30.7	8.2	4.97	0.271	1.54	L 0	7.16	2.63	4.5	0.005
SC-SIXTH1	99/08/29	1045	199909305	94/00686	22.6	6.9	4.94	0.349	1.28	L 0	6.70	2.61	5.3	L 0
	99/08/29	1055		94/00687		6.1							5.3	
	99/08/29	1050	199909307	94/00688	22.4	7.0	4.64	0.413	1.27	L 0	6.69	2.32	5.3	L 0
	99/08/29	1058	199909308	94/00689	22.2	5.5	5.09	0.356	1.29	L 0	6.60	2.44	5.3	L 0
SC-BLTN1	99/07/19	1427	199906669	94/00539	25.4	7.6	4.07	0.296	1.00	L 0	7.17	2.73	5.5	L 0
	99/07/19	1437		94/00540		7.6							5.5	
	99/07/19	1432	199906671	94/005401	25.5	7.7	4.01	0.294	0.99	L 0	7.20	2.73	5.5	L 0
	99/07/19	1440	199906672	94/00542	25.7	7.6	4.00	0.297	1.00	L 0	7.13	2.71	5.5	L 0
	99/08/29	1348	199909309	94/00671	24.8	7.3	4.04	0.317	1.13	L 0	6.91	2.2	bottom	L 0
	99/08/29	1355	199909310	94/00673	24.5	7.2	3.89	0.334	1.15	L 0	6.91	2.32	bottom	L 0
	99/08/29	1358	199909311	94/00674	24.6	6.6	3.84	0.366	1.14	L 0	6.85	2.22	bottom	L 0

L = below limit of quantification. Q = not a quality assured parameter T = trace

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO2 mg/l as N	NO3 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3	AL ug/l as Al	AS ug/l as As
SC-FIFTH1	99/06/28	1810	199905177	94/00489	<10	0.3	L 0	L 0	L 0	L 0	L 0	L 0	5.7	0.031	L 0
	99/06/28	1825	199905178	94/00490											
	99/06/28	1815	199905179	94/00491		0.3	L 0	L 0	L 0	L 0	0.21	L 0	5.5	0.033	L 0
	99/06/28	1830	199905180	94/00492		0.4	L 0	L 0	L 0	L 0	L 0	L 0	5.5	0.035	L 0
	99/07/19	1218	199906665	94/00535	<10	0.2	L 0	L 0	L 0	L 0	L 0	L 0	7.4	0.021	L 0
	99/07/19	1220		94/00536											
	99/07/19	1225	199906667	94/00537		0.3	L 0	L 0	L 0	L 0	L 0	L 0	6.8	0.022	L 0
	99/07/19	1230	199906668	94/00538		0.4	L 0	L 0	L 0	L 0	L 0	L 0	6.5	0.029	L 0
	99/08/29	1200	199909301	94/00682	<10	0.1	L 0	L 0	L 0	L 0	0.23	L 0	6.7	0.016	L 0
	99/08/29	1208		94/00683											
	99/08/29	1205	199909303	94/00684		0.1	L 0	L 0	L 0	L 0	0.20	L 0	6.6	0.017	L 0
	99/08/29	1214	199909304	94/00685		2.2	L 0	0.113	L 0	L 0	0.32	L 0	7.6	0.033	L 0
SC-GFF1	99/06/22	1320	199904935	94/00474	<10	0.6	L 0	L 0	L 0	L 0	0.29	L 0	9	0.039	L 0
	99/06/22	1330		94/00475											
	99/06/22	1340	199904937	94/00476		0.8	L 0	L 0	L 0	L 0	0.31	L 0	9	0.04	L 0
	99/06/22	1350	199904938	94/00477		0.7	L 0	L 0	L 0	L 0	0.26	L 0	9.4	0.044	L 0
	99/08/26	1320	199909259	94/00655		0.2	L 0	L 0	L 0		0.27	L 0	9	0.015	L 0
	99/08/26	1330		94/00656											
	99/08/26	1335	199909261	94/00657		0.2	L 0	L 0	L 0	L 0	0.27	L 0	8	0.012	L 0
	99/08/26	1340	199909262	94/00658		0.3	L 0	0.011	L 0	L 0	0.28	L 0	8	0.013	L 0
	99/07/28	1245	199907456	94/00580	<10	0.4	L 0	0.01	L 0	L 0	0.31	L 0	8.5	0.017	L 0
	99/07/28	1250		94/00581											
	99/07/28	1255	199907460	94/00582		0.5	L 0	0.014	L 0	L 0	0.31	L 0	8.4	0.018	L 0
	99/07/28	1300	199907461	94/00583		0.6	L 0	0.027	L 0	L 0	0.30	L 0	9.3	0.021	L 0
SC-GFF2	99/06/22	1615	199904919	94/00454	<10	0.9	L 0	L 0	L 0	L 0	0.28	L 0	11.2	0.043	L 0
	99/06/22	1630		94/00455											
	99/06/22	1640	199904920	94/00456		0.9	L 0	L 0	L 0	L 0	0.32	L 0	11.5	0.043	L 0
	99/06/22	1645	199904921	94/00457		0.9	L 0	0.081	L 0	L 0	0.45	L 0	12.5	0.085	L 0
	99/07/28	1320	199907454	94/00584	<10	0.3	L 0	0.011	L 0	L 0	0.28	L 0	10.9	0.016	L 0
	99/07/28	1325		94/00585											
	99/07/28	1330	199907456	94/00586		0.7	L 0	0.043	L 0	L 0	0.31	L 0	11.1	0.02	L 0
	99/07/28	1340	199907457	94/00587		6.2	L 0	0.2	L 0	L 0	0.61	L 0	13	0.035	L 0
	99/08/26	1410	199909263	94/00659		0.2	L 0	L 0	L 0	L 0	0.24	L 0	9.9	0.015	L 0
	99/08/26	1420		94/00660											
	99/08/26	1425	199909265	94/00661		0.1	L 0	L 0	L 0	L 0	0.24	L 0	9.5	0.013	L 0
	99/08/26	1430	199909266	94/00662		2.7	L 0	0.102	L 0	L 0	0.36	L 0	10.6	0.023	L 0

L = below limit of quantification Q = not a quality assured parameter T = trace

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	E. coli MPN/100ml	Turb as NTU	TSS mg/l as residue	NH3 T mg/l as N	NO2 mg/l as N	NO3 mg/l as N	TKN mg/l as N	F mg/l as F	HARD mg/l as CaCO3	AL ug/l as Al	AS ug/l as As
SC-MODS1	99/07/11	1905	199905988	94/00515	10	0.5	L 0	0.013	L 0	L 0	0.34	L 0	6.9	0.108	L 0
	99/07/11	1922		94/00516											
	99/07/11	1910	199905990	94/00517	No test	0.7	L 0	0.014	L 0	L 0	0.40	L 0	6.9	0.108	L 0
	99/07/11	1918	199905991	94/00518		0.7	L 0	0.015	L 0	L 0	0.42	L 0	6.8	0.107	L 0
SC-WD1	99/06/23	0830	199904903	94/00437	<10	0.9	L 0	L 0	L 0	L 0	0.37	L 0	9.6	0.042	L 0
	99/06/23	0835		94/00438											
	99/06/23	0840	199904905	94/00439		1	L 0	L 0	L 0	L 0	0.31	L 0	9.9	0.041	L 0
	99/06/23	0845	199904906	94/00440		1	L 0	0.015	L 0	L 0	0.34	L 0	9.9	0.043	L 0
	99/07/18	1410	199906583	94/00555	<10	0.7	L 0	L 0	L 0	L 0	0.29	L 0	10.7	0.024	L 0
	99/07/18	1412		94/00556											
	99/07/18	1417	199906585	94/00557		0.7	L 0	L 0	L 0	L 0	0.30	L 0	10.7	0.027	L 0
	99/07/18	1419	199906586	94/00558		0.8	L 0	L 0	L 0	L 0	0.28	L 0	10.2	0.025	L 0
	99/08/22	1125	199908880	94/00623	<10	0.5	L 0	L 0	L 0	L 0	L 0	L 0	10.4	0.016	L 0
	99/08/22	1128		94/00624											
	99/08/22	1130	199908882	94/00625		0.5	L 0	0.012	L 0	L 0	L 0	L 0	10.3	0.015	L 0
	99/08/22	1135	199908883	94/00626		0.5	L 0	L 0	L 0	L 0	0.24	L 0	10.2	0.016	L 0
SC-WD2	99/06/23	0720	199904899	94/00433	<10	0.8	L 0	L 0	L 0	L 0	0.35	L 0	10.1	0.043	L 0
	99/06/23	0725		94/00434											
	99/06/23	0730	199904901	94/00435		0.9	L 0	L 0	L 0	L 0	0.35	L 0	9.8	0.041	L 0
	99/06/23	0740	199904902	94/00436		0.9	L 0	L 0	L 0	L 0	0.36	L 0	9.8	0.041	L 0
	99/07/18	1300	199906571	94/00523	<10	0.7	L 0	L 0	L 0	L 0	0.28	L 0	11.6	0.028	L 0
	99/07/18	1308		94/00524											
	99/07/18	1305	199906573	94/00525		0.6	L 0	L 0	L 0	L 0	0.3	L 0	10.3	0.029	L 0
	99/07/18	1310	199906574	94/00526		0.8	L 0	0.015	L 0	L 0	0.31	L 0	10.9	0.028	L 0
	99/08/22	1210	199908877	94/00619	<10	0.8	L 0	L 0	L 0	L 0	0.20	L 0	10.3	0.015	L 0
	99/08/22	1215	199908878	94/00621		0.4	L 0	L 0	L 0	L 0	0.34	L 0	10.3	0.015	L 0
	99/08/22	1220	199908879	94/00622		0.4	L 0	L 0	L 0	L 0	L 0	L 0	10.3	0.016	L 0
SC-SIXTH1	99/08/29	1045	199909305	94/00686	<10	0.1	L 0	L 0	L 0	L 0	0.21	L 0	6.5	0.022	L 0
	99/08/29	1055		94/00687											
	99/08/29	1050	199909307	94/00688		0.1	L 0	L 0	L 0	L 0	L 0	L 0	6.5	0.021	L 0
	99/08/29	1058	199909308	94/00689		0.1	L 0	L 0	L 0	L 0	L 0	L 0	6.5	0.027	L 0
SC-BLTN1	99/07/19	1427	199906669	94/00539	<10	0.2	L 0	L 0	L 0	L 0	L 0	L 0	7.9	0.015	L 0
	99/07/19	1437		94/00540											
	99/07/19	1432	199906671	94/005401		0.3	L 0	L 0	L 0	L 0	0.23	L 0	7.7	0.015	L 0
	99/07/19	1440	199906672	94/00542		0.3	L 0	L 0	L 0	L 0	L 0	L 0	8	0.018	L 0
	99/08/29	1348	199909309	94/00671	<10	0	L 0	L 0	L 0	L 0	0.20	L 0	8.2	0.01	L 0
	99/08/29	1355	199909310	94/00673		0.1	L 0	L 0	L 0	L 0	0.20	L 0	8.2	0.01	L 0
	99/08/29	1358	199909311	94/00674		0.3	L 0	0.01	L 0	L 0	0.24	L 0	8.3	0.017	L 0

L = below limit of quantification. Q = not a quality assured parameter T = trace.

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table)

Station #	Date y/m/d	Time from ADT	Lab #	Field #	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni	PB ug/l as Pb	SB ug/l as Sb
SC-FIFTH1	99/06/28	1810	199905177	94/00489	L 0	L 0	L 0	0	0.3	0.0067	L 0	L 0	L 0
	99/06/28	1825	199905178	94/00490									
	99/06/28	1815	199905179	94/00491	L 0	L 0	0.0006	0	0.29	0.0063	L 0	L 0	L 0
	99/06/28	1830	199905180	94/00492	L 0	L 0	0.0006	0	0.29	0.018	L 0	L 0	L 0
	99/07/19	1218	199906665	94/00535	L 0	L 0	L 0	0	0.37	0.005	L 0	L 0	L 0
	99/07/19	1220		94/00536									
	99/07/19	1225	199906667	94/00537	L 0	L 0	0.0006	0	0.34	0.0067	L 0	L 0	L 0
	99/07/19	1230	199906668	94/00538	L 0	L 0	L 0	0	0.33	0.052	L 0	L 0	L 0
	99/08/29	1200	199909301	94/00682	L 0	L 0	L 0	0	0.4	0.0053	L 0	L 0	L 0
	99/08/29	1208		94/00683									
	99/08/29	1205	199909303	94/00684	L 0	L 0	L 0	0	0.39	0.0077	L 0	L 0	L 0
	99/08/29	1214	199909304	94/00685	L 0	0.0005	L 0	0.84	0.4	0.316	L 0	L 0	L 0
SC-GFF1	99/06/22	1320	199904935	94/00474	L 0	L 0	0.0007	0.08	0.58	0.014	L 0	L 0	L 0
	99/06/22	1330		94/00475									
	99/06/22	1340	199904937	94/00476	L 0	L 0	0.0005	0.11	0.58	0.026	L 0	L 0	L 0
	99/06/22	1350	199904938	94/00477	L 0	L 0	0.0005	0.14	0.61	0.037	L 0	L 0	L 0
	99/08/26	1320	199909259	94/00655	L 0	L 0	L 0	0.05	0.6	0.013	L 0	L 0	L 0
	99/08/26	1330		94/00656									
	99/08/26	1335	199909261	94/00657	L 0	L 0	L 0	0	0.53	0.0089	L 0	L 0	L 0
	99/08/26	1340	199909262	94/00658	L 0	L 0	L 0	0.05	0.54	0.013	L 0	L 0	L 0
	99/07/28	1245	199907458	94/00580	L 0	L 0	L 0	0.07	0.55	0.012	L 0	L 0	L 0
	99/07/28	1250		94/00581									
	99/07/28	1255	199907460	94/00582	L 0	L 0	L 0	0.08	0.56	0.015	L 0	L 0	L 0
	99/07/28	1300	199907461	94/00583	L 0	L 0	L 0	0.13	0.61	0.03	L 0	L 0	L 0
SC-GFF2	99/06/22	1615	199904919	94/00454	L 0	0.0005	0.0005	0.12	0.62	0.035	L 0	L 0	L 0
	99/06/22	1630		94/00455									
	99/06/22	1640	199904920	94/00456	L 0	0.0006	0.001	0.16	0.63	0.068	L 0	L 0	L 0
	99/06/22	1645	199904921	94/00457	L 0	0.001	0.0007	0.28	0.71	0.334	L 0	L 0	L 0
	99/07/28	1320	199907454	94/00584	L 0	L 0	L 0	0.08	0.56	0.026	L 0	L 0	L 0
	99/07/28	1325		94/00585									
	99/07/28	1330	199907456	94/00586	L 0	L 0	L 0	0.17	0.59	0.094	L 0	L 0	L 0
	99/07/28	1340	199907457	94/00587	L 0	0.0005	L 0	1.19	0.71	2.87	L 0	L 0	L 0
	99/08/26	1410	199909263	94/00659	L 0	L 0	L 0	0	0.52	0.016	L 0	L 0	L 0
	99/08/26	1420		94/00660									
	99/08/26	1425	199909265	94/00661	L 0	L 0	L 0	0	0.49	0.018	L 0	L 0	L 0
	99/08/26	1430	199909266	94/00662	L 0	0.0006	L 0	0.43	0.6	0.327	L 0	L 0	L 0

L = below limit of quantification Q = not a quality assured parameter T = trace

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	CD ug/l as Cd	CR ug/l as Cr	CU ug/l as Cu	FE mg/l as Fe	MG-D mg/l as Mg	MN mg/l as Mn	NI mg/l as Ni	PB ug/l as Pb	SB ug/l as Sb
SC-MODS1	99/07/11	1905	199905988	94/00515	L 0	L 0	L 0	0.11	0.41	0.014	L 0	L 0	L 0
	99/07/11	1922		94/00516									
	99/07/11	1910	199905990	94/00517	L 0	L 0	0.0007	0.11	0.42	0.015	L 0	L 0	L 0
	99/07/11	1918	199905991	94/00518	L 0	L 0	0.0006	0.11	0.41	0.015	L 0	L 0	L 0
SC-WD1	99/06/23	0830	199904903	94/00437	L 0	0.0005	0.0008	0.13	0.57	0.027	L 0	L 0	L 0
	99/06/23	0835		94/00438									
	99/06/23	0840	199904905	94/00439	L 0	0.0005	0.0016	0.14	0.59	0.03	L 0	1.7	L 0
	99/06/23	0845	199904906	94/00440	L 0	0.0006	0.0011	0.17	0.59	0.046	L 0	L 0	L 0
	99/07/18	1410	199906583	94/00555	L 0	0.0006	0.0005	0.13	0.68	0.017	L 0	L 0	L 0
	99/07/18	1412		94/00556									
	99/07/18	1417	199906585	94/00557	L 0	0.0006	0.0008	0.13	0.67	0.018	L 0	L 0	L 0
	99/07/18	1419	199906586	94/00558	L 0	0.0008	0.0005	0.19	0.62	0.041	L 0	L 0	L 0
	99/08/22	1125	199908880	94/00623	L 0	0.0006	0.0005	0.08	0.61	0.017	L 0	L 0	L 0
	99/08/22	1128		94/00624									
	99/08/22	1130	199908882	94/00625	L 0	0.0005	L 0	0.09	0.61	0.017	L 0	L 0	L 0
	99/08/22	1135	199908883	94/00626	L 0	0.0006	L 0	0.08	0.61	0.016	L 0	L 0	L 0
SC-WD2	99/06/23	0720	199904899	94/00433	L 0	0.0006	0.0006	0.14	0.61	0.032	L 0	L 0	L 0
	99/06/23	0725		94/00434									
	99/06/23	0730	199904901	94/00435	L 0	0.0005	0.0013	0.14	0.59	0.029	L 0	1.8	L 0
	99/06/23	0740	199904902	94/00436	L 0	0.0005	0.0024	0.14	0.59	0.028	L 0	7.7	L 0
	99/07/18	1300	199906571	94/00523									
	99/07/18	1308		94/00524	L 0	0.0006	L 0	0.13	0.7	0.02	L 0	L 0	L 0
	99/07/18	1305	199906573	94/00525									
	99/07/18	1310	199906574	94/00526	L 0	0.0006	0.0005	0.13	0.66	0.02	L 0	L 0	L 0
	99/08/22	1210	199908877	94/00619	L 0	0.0006	L 0	0.06	0.59	0.014	L 0	L 0	L 0
	99/08/22	1215	199908878	94/00621	L 0	0.0006	L 0	0.06	0.6	0.016	L 0	L 0	L 0
	99/08/22	1220	199908879	94/00622	L 0	0.0005	L 0	0.07	0.59	0.014	L 0	L 0	L 0
SC-SIXTH1	99/08/29	1045	199909305	94/00686	L 0	L 0	L 0	L 0	0.38	L 0	L 0	L 0	L 0
	99/08/29	1055		94/00687									
	99/08/29	1050	199909307	94/00688	L 0	L 0	L 0	L 0	0.38	L 0	L 0	L 0	L 0
	99/08/29	1058	199909308	94/00689	L 0	L 0	L 0	L 0	0.38	0.0089	L 0	L 0	L 0
SC-BLTN1	99/07/19	1427	199906669	94/00539	L 0	L 0	L 0	L 0	0.38	0.0077	L 0	L 0	L 0
	99/07/19	1437		94/00540									
	99/07/19	1432	199906671	94/005401	L 0	L 0	L 0	L 0	0.37	0.0068	L 0	L 0	L 0
	99/07/19	1440	199906672	94/00542	L 0	L 0	L 0	L 0	0.39	0.012	L 0	L 0	L 0
	99/08/29	1348	199909309	94/00671	L 0	L 0	L 0	L 0	0.44	0.0072	L 0	L 0	L 0
	99/08/29	1355	199909310	94/00673	L 0	L 0	L 0	L 0	0.44	0.0083	L 0	L 0	L 0
	99/08/29	1358	199909311	94/00674	L 0	L 0	L 0	L 0	0.45	0.014	L 0	L 0	L 0

L = below limit of quantification. Q = not a quality assured parameter. T = trace.

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #		ZN mg/l as Zn	Field data: Bottom depth (m)	Air Temp (C)	Weather	Wind direction	Wind speed (km/h)
SC-FIFTH1	99/06/28	1810	199905177	94/00489	L	0	7.5	22	drizzle, cloud	S	10-12
	99/06/28	1825	199905178	94/00490			7.5	22	drizzle, cloud	S	10-12
	99/06/28	1815	199905179	94/00491		0.011	7.5	22	drizzle, cloud	S	10-12
	99/06/28	1830	199905180	94/00492		0.03	7.5	22	drizzle, cloud	S	10-12
	99/07/19	1218	199906665	94/00535	L	0	10.8	23	overcast	NW	10-12
	99/07/19	1220		94/00536			10.8	23	overcast	NW	10-12
	99/07/19	1225	199906667	94/00537		0.0083	10.8	23	overcast	NW	10-12
	99/07/19	1230	199906668	94/00538		0.0077	10.8	23	overcast	NW	10-12
	99/08/29	1200	199909301	94/00682	L	0	12.5	22	sunny	N	15-20
	99/08/29	1208		94/00683			12.5	22	sunny	N	15-20
	99/08/29	1205	199909303	94/00684	L	0	12.5	22	sunny	N	15-20
	99/08/29	1214	199909304	94/00685	L	0	12.5	22	sunny	N	15-20
SC-GFF1	99/06/22	1320	199904935	94/00474		0.044	6.2	33	sunny, bright	--	0
	99/06/22	1330		94/00475			6.2	33	sunny, bright	--	0
	99/06/22	1340	199904937	94/00476		0.131	6.2	33	sunny, bright	--	0
	99/06/22	1350	199904938	94/00477		0.015	6.2	33	sunny, bright	--	0
	99/08/26	1320	199909259	94/00655	L	0	5.9	-	sunny	SW	0-5
	99/08/26	1330		94/00656			5.9	-	sunny	SW	0-5
	99/08/26	1335	199909261	94/00657	L	0	5.9	-	sunny	SW	0-5
	99/08/26	1340	199909262	94/00658	L	0	5.9	-	sunny	SW	0-5
	99/07/28	1245	199907458	94/00580	L	0	5	--	sunny	--	0
	99/07/28	1250		94/00581			5	--	sunny	--	0
	99/07/28	1255	199907460	94/00582	L	0	5	--	sunny	--	0
	99/07/28	1300	199907461	94/00583		0.0078	5	--	sunny	--	0
SC-GFF2	99/06/22	1615	199904919	94/00454		0.083	10	29	sunny, bright	SW	0-5
	99/06/22	1630		94/00455			10	29	sunny, bright	SW	0-5
	99/06/22	1640	199904920	94/00456		0.034	10	29	sunny, bright	SW	0-5
	99/06/22	1645	199904921	94/00457		0.033	10	29	sunny, bright	SW	0-5
	99/07/28	1320	199907454	94/00584	L	0	10		sunny	--	0
	99/07/28	1325		94/00585			10		sunny	--	0
	99/07/28	1330	199907456	94/00586		0.0055	10		sunny	--	0
	99/07/28	1340	199907457	94/00587		0.022	10		sunny	--	0
	99/08/26	1410	199909263	94/00659	L	0	9.9	-	sunny, bright	W	0-5
	99/08/26	1420		94/00660			9.9	-	sunny, bright	W	0-5
	99/08/26	1425	199909265	94/00661	L	0	9.9	-	sunny, bright	W	0-5
	99/08/26	1430	199909266	94/00662	L	0	9.9	-	sunny, bright	W	0-5

L = below limit of quantification Q = not a quality assured parameter T = trace.

Appendix 5b (cont.). 1999 St. Croix Lakes Study Field and Laboratory Data.
Values shown as zero (0) reflect no detectible value at the limit of quantification (see test methods at end of table).

Station #	Date y/m/d	Time from ADT	Lab #	Field #	ZN mg/l as Zn		Field data: Bottom depth (m)	Air Temp (C)	Weather	Wind direction	Wind speed (km/h)
SC-MODS1	99/07/11	1905	199905988	94/00515	L	0	8.6	--	overcast	NW	10
	99/07/11	1922		94/00516			8.6	--	overcast	NW	10
	99/07/11	1910	199905990	94/00517		0.039	8.6	--	overcast	NW	10
	99/07/11	1918	199905991	94/00518		0.02	8.6	--	overcast	NW	10
SC-WD1	99/06/23	0830	199904903	94/00437	L	0	5.8	--	hazy	--	0
	99/06/23	0835		94/00438			5.8	--	hazy	--	0
	99/06/23	0840	199904905	94/00439		0.009	5.8	--	hazy	--	0
	99/06/23	0845	199904906	94/00440	L	0	5.8	--	hazy	--	0
	99/07/18	1410	199906583	94/00555	L	0	5.8	31	hazy / cloudy	NW	5-10
	99/07/18	1412		94/00556			5.8	31	hazy / cloudy	NW	5-10
	99/07/18	1417	199906585	94/00557		0.0075	5.8	31	hazy / cloudy	NW	5-10
	99/07/18	1419	199906586	94/00556		0.018	5.8	31	hazy / cloudy	NW	5-10
	99/08/22	1125	199908880	94/00623		0.0056	5.5	20	sunny	NE	3-7
	99/08/22	1128		94/00624			5.5	20	sunny	NE	3-7
	99/08/22	1130	199908882	94/00625		0.0092	5.5	20	sunny	NE	3-7
	99/08/22	1135	199908883	94/00626	L	0	5.5	20	sunny	NE	3-7
SC-WD2	99/06/23	0720	199904899	94/00433	L	0	4	17	slight fog	NE	0-5
	99/06/23	0725		94/00434			4	17	slight fog	NE	0-5
	99/06/23	0730	199904901	94/00435	L	0	4	17	slight fog	NE	0-5
	99/06/23	0740	199904902	94/00436		0.017	4	17	slight fog	NE	0-5
	99/07/18	1300	199906571	94/00523			2.9	29	hazy, cloudy	NW	0-5
	99/07/18	1308		94/00524	L	0	2.9	29	hazy, cloudy	NW	0-5
	99/07/18	1305	199906573	94/00525			2.9	29	hazy, cloudy	NW	0-5
	99/07/18	1310	199906574	94/00526		0.0083	2.9	29	hazy, cloudy	NW	0-5
	99/08/22	1210	199908877	94/00619	L	0	5.8	20	high overcast	NE	0-5
	99/08/22	1215	199908878	94/00621		0.015	5.8	20	high overcast	NE	0-5
	99/08/22	1220	199908879	94/00622	L	0	5.8	20	high overcast	NE	0-5
SC-SIXTH1	99/08/29	1045	199909305	94/00686	L	0	6.1	22	sunny	N	5-10
	99/08/29	1055		94/00687			6.1	22	sunny	N	5-10
	99/08/29	1050	199909307	94/00688		0.0054	6.1	22	sunny	N	5-10
	99/08/29	1058	199909308	94/00689	L	0	6.1	22	sunny	N	5-10
SC-BLTN1	99/07/19	1427	199906669	94/00539	L	0	5.5	22	high overcast	NW	0-5
	99/07/19	1437		94/00540			5.5	22	high overcast	NW	0-5
	99/07/19	1432	199906671	94/005401		0.0064	5.5	22	high overcast	NW	0-5
	99/07/19	1440	199906672	94/00542	L	0	5.5	22	high overcast	NW	0-5
	99/08/29	1348	199909309	94/00671	L	0	6	22	sunny	NNE	5-10
	99/08/29	1355	199909310	94/00673	L	0	6	22	sunny	NNE	5-10
	99/08/29	1358	199909311	94/00674	L	0	6	22	sunny	NNE	5-10

L = below limit of quantification. Q = not a quality assured parameter. T = trace.

Appendix 5c. Test method references.

Laboratory method references (New Brunswick Department of the Environment, 1999).

Parameter	Instrument/Method Reference	Limit of quantitation
AL Aluminum	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.001 mg/l
AS Arsenic	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	1.5 µg/l
Alk-G Alkalinity	Auto-Gran's Titration PH 4.5 (Std. Methods 18th ed., 2320.B)	--
CA Calcium	Inductively Coupled Plasma (EPA 200.7)	0.100 mg/l
CD Cadmium	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.1 µg/l
Chl "A" Chlorophyll A	HP Diode Array Spectrophotometry (Std. Methods 17th ed., 10200H)	0.5mg/l
Cl Chloride	Ion Chromatography (Std. Methods 19th ed., 4110B)	0.050 mg/l
CLRA Color (apparent)	Visual Comparison method (Std. Methods 17th ed., 2120B)	0
Cond Conductivity	Conductivity Meter - Radiometer CDM 83 (Std. Methods 17th ed., 2510B)	--
CR Chromium	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.0005mg/l
CU Copper	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.0005mg/l
TOC Total organic carbon	Combustion and NDIR	1.0 mg/l

Parameter	Instrument/Method Reference	Limit of quantitation
E. coli	Colilert method APHA 9221C	MPN/100ml
F Fluoride	F-ion Selective Electrode Radimeter-automated (Std. Methods 17th ed. 4500-F-C)	0.100 mg/l
FE Iron	Inductively Coupled Plasma (EPA 200.7)	0.050 mg/l
HARD Hardness	Calculated (Std. Methods 18th ed.)	1.5mg/l
K Potassium	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.7)	0.10 mg/l
MG Magnesium	Inductively Coupled Plasma (EPA 200.7)	0.200 mg/l
MN Manganese	Inductively Coupled Plasma (EPA 200.8)	0.005 mg/l
Na Sodium	Inductively Coupled Plasma EPA 200.7	0.200 mg/l
NH3 Ammonia	Auto Analyzer II Automatic Phenate Method (Std Methods 17th ed., 4500-NH3 H)	0.01 mg/l
NI Nickel	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.005 mg/l
NO3-D Nitrite	Calculated (Std. Methods 18th ed.)	0.05 mg/l
NO2-D Nitrate	Technicon Auto Analyzer II, Colorimetric	0.05 mg/l

Parameter	Instrument/Method Reference	Limit of quantitation
N0X Nitrite & Nitrate	Technicon Auto Analyzer II Automated Cadmium Reduction Method (Std. Methods 17th ed .. 4500-NO3-F))	0.05 mg/l
PB Lead	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.001mg/l
pH	Hydrogen Specific Radiometer Automated (APHA 2320.B)	--
SB Antimony	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	1.0mg/l
SO4 Sulphate	Ion Chromatography (Std. Methods 19th ed.,)	0.050 mg/l
SS (TSS) Suspended solids	Gravimetric - 934-AH Filter Paper, Microwave Dried	15.0 mg/l
TP-L Total phosphorus	Technicon Auto Analyzer II-Auto UV Digestion	0.005 mg/l
Turb Turbidity	Nephelometic Method (Std. Methods 17th ed.. 2130B)	0. NTU
TKN Total Kjeldahl Nitrogen	Technicon Auto Analyzer II Technicon (Method No 329-74 W/B)	0.2 mg/l
ZN Zinc	Inductively Coupled Plasma - Mass Spectrometer (EPA 200.8)	0.005 mg/l

Field instrument references (St. Croix International Waterway Commission, 1999)

Parameter	Instrument	Limit of quantitation
Dissolved oxygen	YSI Model 57 or Model 80	0.1mg/l
Temperature	YSI Model 57 or 80, Enviro-Safe Thermometer	± 0.2°C
Secchi	Standard disk, fiberglass metric tape, Maine Model II viewing scope	0.05m

Appendix 6. Partial list of interests consulted in St. Croix Water Classification proposal development

Algonquin Hotel
Chiputneticook Lakes International Conservancy
City of Calais (ME)
Conservation Council of New Brunswick
Ducks Unlimited Canada
Environment Canada
Flakeboard Company Ltd.
Freewest Resources Canada Ltd
Georgia-Pacific Corporation
H. J. Crabbe & Sons Ltd
International Joint Commission St. Croix Advisory Board on Pollution Control
J. D. Irving Ltd
Local farm members of the N.B. Federation of Agriculture
Local Service District Advisory Committees for North Lake, St. David's Ridge and Bayside
Local residents from these St. Croix communities: Bayside, Canterbury, DeWolfe, Forest City, Fosterville, Green Mountain, Little Ridge, Lynnfield, McAdam, Mohannes, Moores Mills, North Lake, Oak Haven, Oak Hill, Oak Mountain, St. Andrews, St. Stephen, Scotch Ridge, Skiff Lake, Upper Mills and Waweig
Maritimes & Northeast Pipeline Ltd
Members of the New Brunswick Legislative Assembly for Western Charlotte, Woodstock and York
Nature Trust of New Brunswick
N.B. Agriculture Council
N.B. Department of the Environment
N.B. Department of Natural Resources & Energy
N.B. Department of Transportation
N.B. Prospectors & Developers Association
Maine Department of Environmental Protection
St. Anne-Nackawic Pulp Company Ltd.
St. Croix Estuary Project
Skiff Lake Cottage Owners Association
SWP Industries Inc
Town of St. Andrews
Town of Baileyville (ME)
Town of St. Stephen
Village of McAdam
Woodchem Canada Ltd.
York/Sunbury/Charlotte Forest Products Marketing Board

Appendix 7. St. Croix waters not proposed for preliminary Class A or AL status at March 2000.

Class AP: Designated Drinking Water Supplies

Water	Section	Purpose
Dennis Stream watershed	All waters above Maxwell Crossing	St. Stephen municipal water supply
Limeburners Lake	All waters	St. Andrews municipal water supply
Greenlaws Brook	Limeburners Lake to rail line	St. Andrews municipal water supply

Class B or C: Good or Acceptable Waters

Water	Section	Now meets criteria for this Class	Criteria affected	Proposed Preliminary Class	Suggested Action Plan Summary & Time Frame
St. Croix River	Woodland Flowage	B	habitat	to be studied	New Brunswick to resolve classification jointly with Maine. *By 2003.*
	Woodland dam to Milltown dam	B	water chemistry	to be studied	New Brunswick to resolve classification jointly with Maine. *By 2003.*
	Milltown dam to Spruce Point	B to C-	bacteria, water chemistry, habitat	C	Use paved surface BMPs, *by 2005.* Upgrade town wastewater system to reduce bacteria levels, *by 2010.*
Unnamed Brook, McAdam	McAdam wastewater treatment plant discharge to mouth	C	bacteria, water chemistry	C	Continue good operation of treatment plant. *Ongoing.*
Strachan Brook Composite sub-watershed	All waters except as noted on Tan House & Doodle Brooks	A to B	habitat, potentially water chemistry	B	Apply BMPs to future development. *As warranted.*
Doodle Brook	Source to Bell Subdivision	A to C	habitat	B	Stream cleanup; culvert replacement; shore buffers; BMP plan for future impacts. *By 2002.*
	Bell Subdivision to mouth	B to C	water chemistry, habitat	C	BMP plan to manage storm drain, residential & rail impacts. *By 2003.*

Water	Section	Now meets criteria for this Class	Criteria affected	Proposed Preliminary Class	Suggested Action Plan Summary & Time Frame
Tan House Brook	St. Stephen Drive to Milltown treatment plant	B to C-	water chemistry, habitat	C	Redirect dump leachate to town wastewater treatment system. *By 2010.*
	Milltown treatment plant to mouth	B to C-	bacteria, water chemistry	C	Upgrade town wastewater system to eliminate by-passing. *By 2010.*
Billy Weston Brook	St. Stephen Drive (soon new Highway #1) to Brook St.	A to B	habitat	B	Apply BMPs to future development. *As warranted.*
	Brook St. to mouth	B to C-	bacteria, water chemistry, habitat	C	Multi-source BMP plan, bacteria source identification & correction. *By 2002.*
Dennis Stream	Billy Weston Brook to mouth	B	bacteria, water chemistry	B	Manage uses to maintain high quality for fish populations. *As warranted.* [See also Billy Weston Brook actions, which affect this Dennis Stream segment].
Meadow Brook	Trailer park treatment plant outfall to 200m below Old Bay Rd.	A to C	bacteria, habitat	B	Explore options to upgrade wastewater system to reduce bacteria *and or* create mixing zone; apply paved surface BMPs & shore buffers below highway. *By 2003.*
Benson's Corner Brook	Highway 1 to mouth	B to C-	bacteria, water chemistry, habitat	B	Restore stream at feedlot; stream cleanup and shore buffers. *By 2002.*
Park Brook	Oak Bay Park treatment plant outfall to mouth	A to C (seasonal)	bacteria, water chemistry	C	Maintain recent improvements to treatment plant to minimize bacteria discharge to clam flats. *Ongoing.*
Waweig River	Sub-watershed	A to B	bacteria, water chemistry, habitat	to be studied	Additional classification study. *by 2001.* BMP plan for road, residential and agriculture impacts; shore buffers. *by 2003.*
Pottery Creek	North branch	B to C-	water chemistry, habitat	B	Restore stream bed, add shore buffers, reducemakeup discharge water. *By 2003.*

These are a few of many sources of information on nonpoint source pollution and best management practices, listed in alphabetical order:

Center for Watershed Protection
Books and videos on a wide range of planning and action subjects related to NPS and BMPs.
address 8391 Main St., Ellicott City, MD 21043 USA
tel 410-461-8323 *fax* 410-461-8324 *web* www.cwp.org

Eastern Canada Soil & Water Conservation Centre
Agriculture soil conservation and BMP publications available on the web.
address 1010 chemin de l'Église, DSL Saint André, Grand Falls, NB E3Y 2X9
tel 506-475-4040 *fax* 506-475-4030 *web* www.ecse-swcc.nb.ca

Farm*A*Syst/Home*A*Syst
Pollution assessment and prevention information via publications, newsletter and on-line materials, covering water and other pollution. Two approaches, for farmers and homeowners.
address 303 Hiram Smith Hall, 1545 Observatory Drive, Madison, WI 53706 USA
tel 608-262-0024 *web* www.wisc.edu/farmasyst/index.html

Fundy Model Forest
Video and information on forestry BMPs.
address 181 Aiton Rd., Sussex East, NB E4G 2V5
tel 506-432-2800 *fax* 506-432-2807 *web* www.fundymodelforest.net

Maine Nonpoint Source Training & Resource Center
An impressive range of fact sheets, publications and video rentals on all aspects of NPS and BMPs for homeowners, contractors, municipal officialsand others. Training workshops in spring and fall.
address c/o ME Dept. Environmental Protection, 17 State House Station, Augusta, ME 04333 USA
tel 207-287-7726 *fax* 207-287-7191 *web* janus.state.me.us/dep/blwq/training/nps.htm

NEMO at UConn Extension
Good, user-friendly information on NPS and BMPs for municipal officials and others. Many project examples from local communities.
address Nonpoint Education for Municipal Officials (NEMO), c/o UConn Cooperative Extension System, P. O. Box 70, Haddam, CT 06438-0070 USA
tel 860-345-4511 *fax* 860-345-3357 *web* www.lib.uconn.edu/CANR/ces/nemo.index.html

N.B. Department of Natural Resources & Energy
Two publications with BMP how-tos for forestry activities (Forest Management Manual and Buffer Zone Guidelines), obtainable through district ranger offices and regional wood marketing boards. Check a local phone book for the nearest source or contact:
address: Forest Management Branch, Dept. Natural Resources & Energy, Box 6000, Fredericton, NB E3B 5H1

N.B. Department of Environment & Local Government
Literature reviews/summaries of BMPs for agriculture and forestry.
address: Environmental Planning Section, NB Dept. of the Environment, Box 6000, Fredericton, NB E3B 5H1
tel 506-457-4846 *fax* 506-457-7823 *email* outreach.and.partnering@gov.nb.ca

Nonpoint Source News-Notes
An extensive (and free) monthly US publication on NPS/BMP projects, legislation, education, research, etc. Issues also available on the web.

address c/o Terrene Institute, 4 Herbert St., Alexandria, VA 22305 USA
web www.epa.gov/owow/info/NewsNotes/index.html

US EPA Nonpoint Source Pollution Control Program
Basic information, fact sheets, contacts, publications, BMP examples, access to other EPA programs.

address Office of Water, US EPA, 1200 Pennsylvania Avenue NW, Washington, DC 20460 USA
web (different best ways to contact depending upon your interest...)
for basic information on NPS and contacts: www.eng.vt.edu/bse/swcs/NPSindex.html
for NPS publications and BMP examples: www.epa.gov/owow/NPS/education.html
for information on all EPA water programs: www.epa.gov/owow/index.html

WATERSHEDSS (Water, Soil, and Hydro-Environmental Decision Support System)
BMP information and manuals for a wide range of activities, available free on the web.

address NCSU Water Quality Group, Dept. of Agricultural & Extension Education, North Carolina State University, 120 Ricks Hall, Box 7607, Raleigh, NC 27695-7607 USA
tel 919-515-2707 *fax* 919-515-1965 *web* h2osparc.wq.ncsu.edu/info/bmps.html